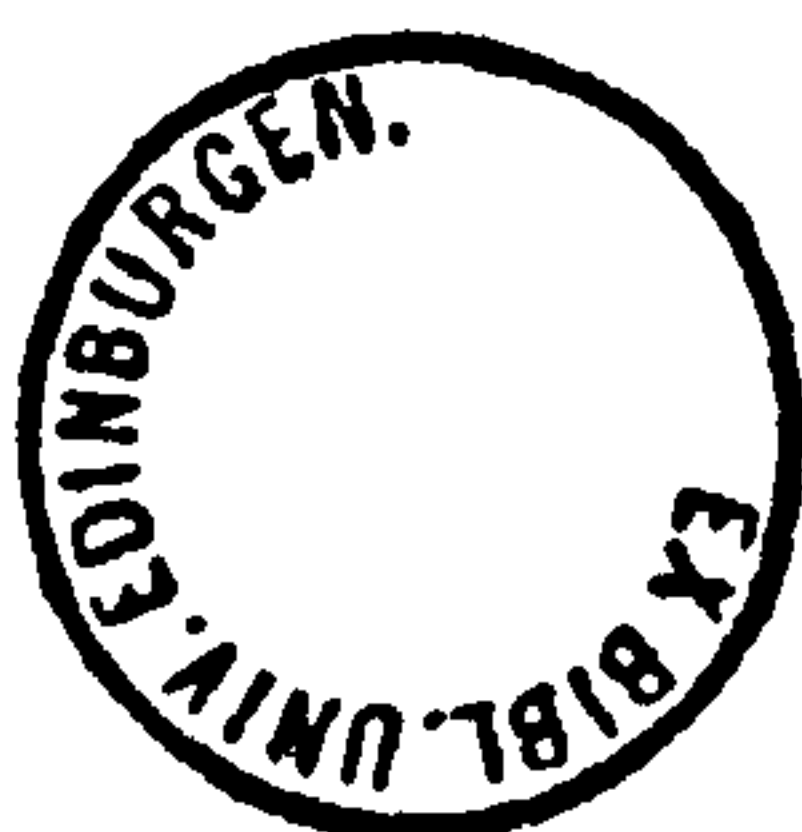


FROM BRONZE TO IRON
THE OCCURRENCE OF IRON IN THE
BRITISH LATER BRONZE AGE

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DECLARATION

I declare that the research for and writing of this thesis was undertaken entirely by myself.

Anne L. Turnbull
January, 1984

ABSTRACT

The primary aim of this thesis is to provide a list of the occurrence of iron, both artefacts and metallurgical débris, in secure Later Bronze Age contexts in Great Britain, the equivalent material from Ireland having been omitted on account of Dr B. Raftery's recent research. Such a list was compiled by means of a thorough search through eighty-five national and county journals, followed by examination of the material so extracted in museums throughout Britain. The contexts, identifications and dates of the material listed in the resultant "Primary Catalogue" are thus assured, spurious evidence having been relegated to the Secondary lists to be found at the end of the thesis.

For the purposes of this study Britain has been divided into thirteen areas, such units being intended to represent later prehistoric cultural entities; of these, all but two - the Upper and Middle Thames Valley and the Fenland area - contain evidence of the manufacture or use of iron between the ninth and seventh centuries B.C., the densest concentrations of finds occurring in North Wiltshire, Dorset and Hampshire, North Somerset and the Cotswolds, Kent and East Yorkshire. Both decorative and functional artefacts were produced throughout this period, the latter being in the majority, while evidence of ironworking is likewise found on sites of all three centuries; the manufacture of large tools and weapons however, would appear to be confined to the seventh century.

In the third section, the significance of the data set out previously is examined, due consideration first being given to the constraints which limit, and the biases which confuse, such interpretation. Two points emerge from this discussion, first, that iron was manufactured

and used at a constant level throughout the ninth to seventh centuries and second, that such activity occurred in areas close to sources of iron ore - and it is upon these that the hypothesis ventured in the concluding part of that section is built. It is suggested that the adoption of iron in Britain occurred in three stages, the first, the inception of the technology, taking place in the later second millennium and the third, that in which iron became the dominant metal for edge tools, occurring in the sixth century B.C. The second stage, that upon which the present study concentrates and which is described as a phase of transition or "semi-dormant technology", sees the manufacture of iron and bronze occurring symbiotically in certain regions of Southern Britain, the occurrence of the former being argued to permit the continuance of the latter during the seventh century B.C.

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Numerous sites of Later Bronze Age - Early Iron Age date have only recently been excavated and thus it is inevitable that much information currently stands unpublished. I am therefore exceedingly grateful to the following directors who allowed me to read drafts of forthcoming reports or permitted access to other unpublished materials:

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ABBREVIATIONS

Acta Arch.	<i>Acta Archaeologia</i>
Acta Arch. Hungaricae	<i>Acta Archaeologia Academiae Scientiarum Hungaricae</i>
Acta Praeh. et Arch.	<i>Acta Praehistorica et Archaeologica</i>
A.J.A.	<i>American Journal of Archaeology</i>
Ant. J.	<i>The Antiquaries Journal</i>
Antiq.	<i>Antiquity</i>
Archaeol.	<i>Archaeologia</i>
Arch. Ael.	<i>Archaeologia Aeliana</i>
Arch. Atl.	<i>Archaeologia Atlantica</i>
Arch. Camb.	<i>Archaeologia Cambrensis</i>
Arch. J.	<i>The Archaeological Journal</i>
Arch. Polonia	<i>Archaeologia Polonia</i>
Arch. Rozh.	<i>Archeologické Rozhledy</i>
Archaeom.	<i>Archaeometry</i>
Ash.	<i>The Ashmolean Museum, Oxford</i>
B.A.J.	<i>Berkshire Archaeological Journal</i>
B.A.R.	<i>British Archaeological Reports</i>
B.B.C.S.	<i>Bulletin of the Board of Celtic Studies</i>
Bedf. Arch.	<i>Bedfordshire Archaeology</i>
Bedf. Arch. J.	<i>Bedfordshire Archaeological Journal</i>
Berks. Arch. Comm. Public.	<i>Berkshire Archaeological Committee Publication</i>
B.M.	<i>British Museum, London</i>
B.R.G.K.	<i>Bericht der Römisch-Germanischen Kommission</i>
Brit. Mus. Occ. Paper	<i>British Museum Occasional Paper</i>
B.S.P.F.	<i>Bulletin de la Société Préhistorique Française</i>
Bull. Inst. Arch. Univ. London	<i>Bulletin of the Institute of Archaeology, University of London</i>
Bull. Wealden Iron Res. Gp.	<i>Bulletin of the Wealden Iron Research Group</i>
C.B.A. Res. Rept.	<i>Council for British Archaeology Research Report</i>
Colchester Arch. Gp. Quarterly Bull.	<i>Colchester Archaeological Group Quarterly Bulletin</i>
Corn. Arch.	<i>Cornish Archaeology</i>
Curr. Arch.	<i>Current Archaeology</i>

D. and E.	<i>Discovery and Excavation in Scotland</i>
Dept. Env. Res. Rept.	<i>Department of the Environment Research Report</i>
Derby. Arch. J.	<i>Derbyshire Archaeological Journal</i>
D.M.	<i>Devizes Museum, Devizes, Wiltshire</i>
D.M.C.	<i>Devizes Museum Catalogue = Cunnington and Goddard, 1934</i>
E.R.B.	<i>Runnymede Bridge, Egham, Surrey</i>
Essex Arch. and Hist.	<i>Essex Archaeology and History</i>
Glas. Arch. J.	<i>Glasgow Archaeological Journal</i>
Herts. Arch.	<i>Hertfordshire Archaeology</i>
Herts. Arch. Rev.	<i>Hertfordshire Archaeological Review</i>
Int. J. Naut. Arch.	<i>The International Journal of Nautical Archaeology and Underwater Exploration</i>
Inv. Arch.	<i>Inventaria Archaeologia</i>
Irish Arch. Res. Forum	<i>Irish Archaeological Research Forum</i>
J.B.A.A.	<i>Journal of the British Archaeological Association</i>
J. Field Arch.	<i>Journal of Field Archaeology</i>
J. Hist. Metall. Soc.	<i>Journal of the Historical Metallurgy Society</i>
J. Iron and Steel Inst.	<i>Journal of the Iron and Steel Institute</i>
J.R.S.	<i>Journal of Roman Studies</i>
Lincs. Hist. and Arch.	<i>Lincolnshire History and Archaeology</i>
London Arch.	<i>The London Archaeologist</i>
Med. Arch.	<i>Medieval Archaeology</i>
Mem. de la Soc. Préh. Fr.	<i>Memoires de la Société Préhistorique Française</i>
Milton Keynes J. Arch. Hist.	<i>Milton Keynes Journal of Archaeology and History</i>
Mus. London	<i>The Museum of London, Barbican</i>
N.C.M.	<i>Norwich Castle Museum (Catalogue = Green, 1977)</i>
N.M.A.S.	<i>National Museum of Antiquities of Scotland, Edinburgh</i>
Norf. Arch.	<i>Norfolk Archaeology</i>
Northants. Arch.	<i>Northamptonshire Archaeology</i>
North Munster Antiq. J.	<i>North Munster Antiquarian Journal</i>
O.J.A.	<i>Oxford Journal of Archaeology</i>
Oxon.	<i>Oxoniensia</i>
P.B.F.	<i>Prähistorische Bronzefunde</i>
P.C.A.S.	<i>Proceedings of the Cambridge Antiquarian Society</i>

P. Cottes. Nat. Field Club	<i>Proceedings of the Cotteswold Naturalists Field Club</i>
P.D.A.S.	<i>Proceedings of the Devon Archaeological Society</i>
P.D.A.E.S.	<i>Proceedings of the Devonshire Archaeological Exploration Society</i>
P.D.N.H.A.S.	<i>Proceedings of the Dorset Natural History and Archaeological Society</i>
P.H.F.C.	<i>Proceedings of the Hampshire Field Club and Archaeological Society</i>
P.P.S.	<i>Proceedings of the Prehistoric Society</i>
P.P.S.E.A.	<i>Proceedings of the Prehistoric Society of East Anglia</i>
Präh. Zeitschr.	<i>Prähistorische Zeitschrift</i>
Proc. Roy. Irish Acad.	<i>Proceedings of the Royal Irish Academy</i>
Proc. Suff. Inst. Arch.	<i>Proceedings of the Suffolk Institute of Archaeology</i>
P.S.A.L.	<i>Proceedings of the Society of Antiquaries of London</i>
P.S.A.S.	<i>Proceedings of the Society of Antiquaries of Scotland</i>
P.U.B.S.S.	<i>Proceedings of the University of Bristol Spelaeological Society</i>
P.W.C.F.C.	<i>Proceedings of the West of Cornwall Field Club</i>
R.A.E.C.E.	<i>Revue Archéologique de l'Est et du Centre-Est.</i>
Rec. of Bucks.	<i>Records of Buckinghamshire</i>
Repts. and Trans. Devon. Assoc.	<i>Reports and Transactions of the Devonshire Association</i>
Reps. Trans. Cardiff Nat. Soc.	<i>Reports and Transactions of the Cardiff Naturalists Society</i>
R.G.F.	<i>Römisch-Germanische Forschungen</i>
S.A.F.	<i>Scottish Archaeological Forum</i>
Sal.	<i>Salisbury and South Wiltshire Museum, Salisbury</i>
S.A.N.H.S.	<i>Somerset Archaeological and Natural History Society Proceedings</i>
S.A.R.	<i>Scottish Archaeological Review</i>
Sci. Amer.	<i>Scientific American</i>
S.D.A.S.	<i>Scarborough District Archaeological Society Proceedings</i>
Slov. Arch.	<i>Slovenská Archeológia</i>

Suff. Inst. Arch. and Hist.	<i>Suffolk Institute of Archaeology and History</i>
Sx. Arch. Colls.	<i>Sussex Archaeological Collections</i>
Sx. Notes and Queries	<i>Sussex Notes and Queries</i>
Sy. Arch. Colls.	<i>Surrey Archaeological Collections</i>
T.B.G.A.S.	<i>Transactions of the Bristol and Gloucestershire Archaeological Society</i>
T.E.A.S.	<i>Transactions of the Essex Archaeological Society</i>
Trans. Caern. Hist. Soc.	<i>Transactions of the Caernarvonshire Historical Society</i>
Trans. Denbigh. Hist. Soc.	<i>Transactions of the Denbighshire Historical Society</i>
Trans. Hist. Soc. Lancs. and Cheshire	<i>Transactions of the Historic Society of Lancashire and Cheshire</i>
Trans. L.A.M.A.S.	<i>Transactions of the London and Middlesex Archaeological Society</i>
Trans. Newb. Dist. Field Club	<i>Transactions of the Newbury District Field Club</i>
U.I.S.P.P.	<i>Union Internationale des Sciences Préhistoriques et Protohistoriques</i>
U.J.A.	<i>Ulster Journal of Archaeology</i>
Univ. Durham Newc. Arch. Rept.	<i>University of Durham and Newcastle Archaeological Report</i>
Univ. Liv. Ann. Arch. Anthr.	<i>University of Liverpool Annals of Archaeology and Anthropology</i>
Univ. London Inst. Arch. Ann. Rept.	<i>University of London Institute of Archaeology Annual Report</i>
V.C.H.	<i>The Victoria History of the Counties of England</i>
V.G.F.	<i>Vorgeschichtliche Forschungen</i>
W.A.M.	<i>The Wiltshire Archaeological and Natural History Magazine</i>
Y.A.J.	<i>The Yorkshire Archaeological Journal</i>
Z.f.A.	<i>Zeitschrift für Archäologie</i>

SECTION I

BACKGROUND TO THE STUDY

CHAPTER 1

The Historical, Continental and Metallurgical Backgrounds

PART I: The Historical Background

Studies such as this conventionally begin with a detailed discussion of previous research into the British Late Bronze and Early Iron Ages, in which the most significant articles and site reports are examined in chronological order - as in the recent publications of Cunliffe (1974a and 1978a), Avery (1976), Champion (1979) and O'Connor (1980).

Wishing to avoid unnecessary duplication I intend rather to distil one theme from the vast, and ever-increasing, body of Iron Age literature and consider the ways in which attitudes towards the adoption of iron in Southern Britain, intimately linked to those concerning that area's relationship with the Continent, have changed, and even influenced research, during the last fifty years; in describing the trend from a viewpoint which conceived of a cataclysmic introduction of iron to one which now champions a smooth transition from bronze to iron without major incursions, I shall distinguish three eras: those of Hawkes from 1930 to the late 1950's, Hodson in the 1960's and Champion in the 1970's.

It was within a climate of thought which viewed invasion as the sole cause of innovation within the British Isles, as witnessed in the writings of Abercromby (1912), Crawford (1922), Peake (1922) and Evans (1930), that Professor C.F.C. Hawkes formulated his view of the beginning of the Iron Age in Southern Britain, published in a series of articles in the early 1930's: a chapter in the report on the excavations at St Catharine's Hill, Hants., (1930, 140-168), an article in Antiquity (1931, 60-97), a section in the Handbook to British Prehistory (1932) and Chapters IX and X in The Archaeology of England and Wales, written jointly with T.D. Kendrick (1932). In summary, he argued that during the first half of the first millennium, Lowland Britain was penetrated by "a constant trickling of immigrant groups" (1932, 153),

beginning with the already accepted Late Bronze Age immigrations from the West Alpine area (Crawford, 1922) and followed by a series of movements from the Lower Rhine and the Netherlands from the eighth century (1932, 152); these latter reached their height in the sixth and fifth centuries B.C. due to pressure on the peoples of the Lower Rhine from early Germanic tribes advancing from the North East, and were responsible for the introduction into Southern England of Late Hallstatt Culture, transmuted there into our Iron Age A or All Cannings Cross culture, and comprising haematite coated and incised pottery, tribal economy, the idea and practice of building hillforts - and the use of iron.

Hawkes made various modifications to this scheme such as introducing the concept of a horizon of hillfort building in Sussex around 250 B.C., seen as a native defence against further, Marnian, invaders (1939b), but with regard to the theme under review the next significant paper was that he delivered as the introductory lecture to a conference on the Southern British Iron Age in 1958, published the following year in Antiquity. In this, the Hallstatt colonizing era from 550 B.C. till 400 B.C., phase 1a, responsible as before for the advent of First A culture and allied to late Hallstatt on the Continent, was seen as having been preceded by a prelude of adventuring beginning in the seventh century, indicative of the incursion of pioneers from the Continent prospecting for land and vital iron ores. Iron was now thought of as occurring as early as the beginning of the sixth century, following the conclusions reached in the seminal paper he and Miss Smith had published in the previous year (Hawkes and Smith, 1957, 131-198) in which it had been demonstrated that Fox's date for the second B1 cauldron from the Llyn Fawr hoard, Glam., (Fox and Hyde, 1939, 379), ascribed to c. 500 B.C. in

deference to Leeds' chronological scheme for such vessels, was unnecessarily retarded by a century.

Here, then, we have a scheme in which the Early Iron Age is seen as being distinctively different from the Late Bronze Age, the traits which comprise it as being introduced simultaneously (a function of the use of the invasion model), Southern Britain as being distinct from the Continent and iron as vastly superior to bronze, its introduction being "nothing less than a revolution" (Hawkes, 1931, 62). Thus in 1940 Childe could write:

"It took an actual immigration of land hungry peasants to effect the transformation. Such immigration is abundantly attested in the archaeological record from Southern England by changes in settlement form, architecture, pottery and the general mode of life."

(1940, 187)

A cataclysmic transition indeed.

The second era to which I wish to point is that of the 1960's, a decade in which the climate of thought shifted from the "obsessive" preoccupation with invasions (Clark, 1966) to a viewpoint which stressed insular continuity and indigenous processes of change, heralded by the work of Butler and Smith on the British urn tradition (1956), and witnessed in Longworth and Smith's ceramic studies (1961; 1961) and those of Jope and Cowen on daggers and swords (1961; 1967). With regard to the beginning of the Iron Age, the principal proponent of continuity was Professor F.R. Hodson who published his views in a series of papers in the early 1960's: "Reflections on 'The ABC of the British Iron Age'", (1960, 138-40), "Some Pottery from Eastbourne, the 'Marnians' and the Pre-Roman Iron Age in Southern England" (1962, 140-155) and "Cultural Grouping within the British pre-Roman Iron Age"

(1964, 99-110). In challenging Hawkes' scheme which he saw as resting on the unsubstantiated assumption of three successive waves of invasion, and rejecting the idea of a massive invasion of Hallstatt peoples on the grounds of the meagreness and ambiguity of the evidence, (1964, 101; 104-105), he grouped "the great bulk of British Iron Age material", with the exception of the Arras and Aylesford complexes, under the heading "Woodbury Culture", the diagnostic traits of which "may be interpreted as the surviving traditions of a native Bronze Age population", fundamentally distinct from any Continental culture.

Ironically, such articles were written at a time when the "void" in the Late Bronze Age - which is only now being filled (Harding, 1974, chapter 8; Barrett, 1975, 1976a, 1978, 1979a, 1980a) - had first been opened, and the very antecedents to which he was pointing pushed back to the closing centuries of the second millennium B.C.. In an examination of the Nordic imports in the supposedly Late Bronze Age hoard from Blackrock, Sussex, (1949, 107-121) Mrs. Piggott had pointed to "an unresolved discrepancy between the Northern and the British sequences" (118, 121); and ten years later Miss Smith reconsidered this problem in an important paper entitled "Some Somerset hoards and their place in the Bronze Age of southern Britain" (1959, 144-187). In this she showed - and it was a conclusion reached independently, though not published till later, by Butler, in his thesis on the relationships between the British Isles, North Germany, the Netherlands and Scandinavia during the Bronze Age (1963, 3) - that the Nordic parallels for the ornaments found in association with trapezoid-hilted rapiers, side - and basal - looped spearheads, and palstaves belonged predominantly to Period III of the North European Montelien System (c. 1300-1100 B.C.) and that such a date should apply equally to the British bronzes, hitherto regarded as Late Bronze Age.

Such a conclusion has repercussions far beyond the sphere of metalwork typology, for Ornament Horizon bronzes overlapped the distribution of Deverel-Rimbury finds in Dorset, Wiltshire and Sussex, and, in a few instances, were associated with Deverel-Rimbury settlements, burials and field systems. Thus the entire Deverel-Rimbury complex, regarded since Crawford's discussion of 1922 as a Late Bronze Age phenomenon resulting from an influx of Urnfield peoples from the Continent in the eighth century bringing new settlement, agriculture, ceramic and burial forms, was pulled back into the later Middle Bronze Age. This radical reappraisal was quickly accepted - it was substantiated by Miss Smith's own programme of spectrographic analyses published jointly with Blin-Stoyle in that same volume of the Proceedings of the Prehistoric Society (188-208) which showed that Ornament Horizon bronzes consistently contained levels of lead below that characteristic of the Late Bronze Age alloy (but see Hughes, 1979), and was consistent with the dating of class II razors, frequently associated with the Deverel-Rimbury complex - so much so that in the following year, Hawkes suggested a date within his Middle Bronze Age 2 phase (1200-1000 B.C.) for the origin of the Deverel-Rimbury complex (Hawkes, 1960). Radio-carbon dates have since confirmed Miss Smith's thesis, though a wider view, both in terms of chronology and contacts, is now preferred to her narrow horizon (Rowlands, 1976; Lawson, 1979).

The Late Bronze Age was thereby left largely devoid of settlements, burials and ceramics, a situation which contrasted strangely with the flourishing bronze industries, and attempts were made to lessen the gap by lengthening Iron Age chronology or bridge it by envisaging continuity of Deverel-Rimbury material into the Late Bronze Age. Thus in 1972 Hawkes wrote:

"And from Deverel, once established, tradition runs into the first millennium, remains a basic element beside any Recent Bronze introductions and may still be judged not wholly extinct among those of our earlier Iron Age",

(1972, 115)

a sentiment with which it would appear from Figure 1 in his article of 1964 that Hodson concurred. More recently, Cunliffe has argued for the late survival of Deverel-Rimbury pottery styles in Southern Britain until the mid-eighth century (his Ultimate Deverel-Rimbury culture, 1978a, 32-33) hence creating an erroneous impression of "massive continuity" and "conservatism" in the period between c. 1400 B.C. and 700 B.C.

Ironically, too, it was research into one of the traits which Hodson avoided in his definition of the Woodbury Culture, namely hillforts - an odd omission in view of his earlier plea that type fossils ought to be "general and distinctive types" (1962, 154) - that first supported his contention of insular continuity and paved the way towards the new set of attitudes which were to become dominant in the next decade. Radiocarbon dates began to be accumulated, pioneered by the work of MacKie on Scottish hillforts, following Piggott's suggestion of their possible Late Urnfield connections (MacKie, 1969, 1971; Piggott, 1973a, 203, 213), which pointed to the long development and Late Bronze Age background of hillforts, with hilltop occupation, and in some cases even the construction of defences, stretching back to the later second millennium in North Wales and the Marches, South Western and Northern England, Ireland and Scotland. It is interesting to observe that despite such back-dating, the Hawkesian model lived on in the minds of some (MacKie, 1976; Savory, 1971a, 1976b; Burgess, 1974, 207-220; 1980, 268, 278; *contra* Bradley and Ellison, 1975, 167-170) with the idea and

practice of hillfort building, or at least the acquisition of timbered ramparts, still being attributed to continental influence, now no longer seen as Hallstatt, but rather Urnfield, and in the Penard phase. It was in the field of hillfort studies, too, that a new approach to the study of the adoption of Hawkes' Iron Age traits, fostered by the climate of anti-invasionist thought, was first adopted. Three articles published in 1971 (Bradley, 1971a, 1971b; Cunliffe, 1971a) encapsulate this new attitude, for all are concerned with explaining the establishment and growth of hillforts in terms of arable and pastoral intensification, population growth, and economic and social change - in short, are "looking to the inherent dynamism of economic and social life" as urged by Clark in his rejoinder to Hawkes' criticism of his article of 1966 (Clark, 1966, 298-9).

With regard to the theme under review, two significant developments have been seen to occur in this, my second, era. Without considering the details of his scheme, Hodson's rejection of invasion to account for the beginning of the British Iron Age and his quest for insular antecedents in the Bronze Age encouraged enquiry into other mechanisms of change, and permitted the realisation that the traits which Hawkes had seen as characteristic of the Iron Age need not have arrived *en masse* nor need they even be termed "Iron Age". We shall see that such concepts were of vital importance to subsequent research.

The third of my three eras, the 1970's, saw the publication of a number of important works on the Iron Age, notably by D.W. Harding (1972, 1974, 1976) and B.W. Cunliffe (1974a); however, while I shall refer to these, I wish to concentrate on the work of T.C. Champion, for it is his views, I believe, that have altered most noticeably current attitudes to the theme under discussion, first expressed in a short

article entitled "The End of the Irish Bronze Age" (1971, 17-24), developed in his thesis, "The Earlier Iron Age in the Region of the Lower Thames" (1976), brought to wider notice in an article in Archaeologia Atlantica (1975, 127-145) and summarised in a chapter in Megaw and Simpson's recent synthesis (Megaw and Simpson, 1979, 344-432).

In the publications of 1975 and 1976 he presented an elegant critique of the concepts which had underpinned the works of both Hawkes and Hodson, criticising first their treatment of Britain and Europe as two homogeneous units capable of being discussed separately. In challenging the belief that Iron Age houses in Britain were circular, those on the Continent rectangular (Hodson, 1964, 103), Harding had already proposed the idea of a cross-channel cultural province in the Iron Age, whereby the area from Northern France to Southern Holland was more closely allied to South Eastern England than to Central Europe, and South Eastern England itself closer to the Atlantic coast than to the rest of Britain, concluding:

"Thus Britain and the mainland opposite would be parts of one whole".

(1973, 55)

Champion extended this discussion to embrace other selected aspects of settlement and subsistence archaeology: pits, posthole configurations, ditched enclosures, triangular clay loomweights and agriculture. Such a model puts an entirely different complexion on the invasion hypothesis, for in the words of Piggott:

"If we ask whether the English Channel was not a moat defensive but a sea connective, a wide river between related lands, the invasion hypothesis could vanish in the context of coasting voyages around and across an elongated lake, opening onto the North Sea to the East and the Atlantic on the West."

(1979, 11)

Secondly, Champion challenged the culture model used by both Hawkes and Hodson whereby elements of material culture are grouped into regularly recurring assemblages (Childe, 1929), urging rather that such groupings be broken down and the distribution and chronology of every trait investigated independently, an approach which, as we have seen, had been prevented by the invocation of invasion as the model of change. The terminology applied to this phase of later pre-history was seen as a further hindrance to clear understanding, highlighting the "incidental change" in technology in the seventh century and obscuring the realisation that "this technological process occurs in a period that otherwise shows a normal internal development of its material culture" (1975, 138); instead, he advocated the use of a scheme such as that of Reinecke or Maluquer de Motes (1971, 110), which emphasises the cultural continuity of this phase following the major break in the twelfth century at the start of the Urnfield period. It will be one of the aims of this study to investigate the changes in economy, industrial organisation, settlement pattern and social organisation caused by the adoption of iron and to ascertain whether it can really be described as "incidental" or "a technological gloss".

As an illustration of the approach to the culture model which he was proposing, Champion briefly reassessed the chronology of certain

ceramic assemblages from South Eastern England hitherto regarded as Iron Age. Despite their resemblance to Urnfield ceramics their true date could not be accepted (although contemporaneity was accepted, and indeed urged, in the realms of settlement and bronze studies) and instead the concept of time-lag was invoked. Thus Hawkes had written of the pottery from All Cannings Cross as having "Urnfield reminiscences" (1959, 177) while Hodson exemplified the idea of "cultural archaism" by pointing to the

"rilled ware from sites like Little Woodbury which has reasonably been claimed to embody Continental Urnfield traditions but has conserved them long after they had become obsolete in Central Europe".

(1964, 105)

When such supposedly Early Iron Age pottery was found in association with Late Bronze Age metalwork the date of the latter was depressed to conform to that of the former; thus in the report on the excavations at Ivinghoe Beacon it is argued:

"An inspection of the pottery suggests that it belongs to an early phase of the Iron Age, Southern First A. The metal objects found, however, all of bronze, propose an even earlier date, for without exception they all belong to, or can be at home in, the preceding Late Bronze Age. How much later such objects would continue to be made is at present unknown, but there are several hints that they could still be current in the sixth. The Iron Age features (of the pottery) should serve to lower the date suggested by the bronzes in isolation, since these features are themselves the result of changes brought about by Hallstatt movement into Britain."

(Cotton & Frere, 1968, 200, 202)

In his recent thesis and the resultant article "Furrowed bowls and carinated Hawkes A pottery" (1979; 1981), Avery has extended Champion's discussion, the latter limited to material from Fengate, Welby and Barmston and their parallels in assemblages in the Low Countries, arguing that furrowed bowls should be seen as contemporary with Ha.A2 examples from the Rhine and France and thus should follow almost directly from Deverel-Rimbury assemblages in the 11th century B.C. in Southern England, while certain styles of Hawkes' carinated bowls should date to the Ha.A/B1 horizon and thus start in the early 10th century. Later I shall consider the arguments behind the implications of this radical hypothesis, mentioning it here simply to demonstrate Avery's agreement, in principle if not in detail, with Champion's view that Britain should be seen as "a contemporary variant" of Urnfield Europe, and that certain elements of material culture hitherto regarded as Iron Age can be seen to originate in the Later Bronze Age, in Southern Britain as on the Continent.

Champion further proposed a radical reappraisal of the manner and date of the introduction of iron and its relationship to putative Hallstatt invaders. In summary, his argument undermined the four foundations upon which previous hypotheses had been built, which were as follows: first, that the coastal-riverine distribution of Hallstatt bronzes - warrior equipment such as razors, swords, chapes and horse-gear - was indicative of the presence of raiding parties from the Continent from the mid-seventh century B.C., followed by Hallstatt settlement in the sixth and fifth centuries; second, that the knowledge of iron spread slowly from the end of the seventh century/beginning of the sixth century (Hawkes and Smith, 1957; Jope, 1961) and its use began to escalate only towards the end of the latter; third, that it was

Hallstatt "master invaders" who pioneered the exploitation of iron resources in Britain - "to find its iron we must have Hallstatt immigrants [for] Hallstatt masters' demands for it alone could break the monopoly of bronze" (Hawkes, 1976a); and fourth, that the paucity of associations between Hallstatt bronzes and native hoards was indicative of two exclusive ethnic groups, natives and Hallstatt invaders.

Eschewing the unwarranted concept of time-lag and taking a broader view which embraced Western and Central Europe, Champion argued that in South Eastern Britain, as on the Continent, hoard deposition ceased in the seventh century B.C. with the onset of Hallstatt C and the rapid spread of its attendant traditions - which included the practice of iron working; thus the lack of association could be viewed as a chronological rather than an ethnic phenomenon. Nor should the significance of Hallstatt swords and martial equipment be exaggerated for their occurrence is to be expected and their distribution identical to that of preceding sword-types. Following Cowen (1967), he observed that the Gundlingen swords from Britain are regional variants rather than imports, while those of Cowen's Group b testify to his concept of a cross-channel cultural province.

In two papers written in 1979 and 1980, the first occasioned by his study of part of a putative hoard from Boyton, Suffolk, comprising a south-eastern socketed axe and a fragment of a Gundlingen sword blade, Burgess accepted the chronological implications of Champion's article and produced a partial catalogue of those finds of iron which could be attributed to the seventh century, his Llynfawr or Late Bronze Age 3 period. Hallstatt raiders are now Hallstatt smiths; they alone, he argued, could have fashioned Cowen's Class c swords, so "alien in concept and execution" were they to Irish-British traditions

(1979, 275), and it is they who are seen as being responsible for the rapid dissemination of ironworking, so utterly different from bronze technology as to require the presence here of alien craftsmen.

While Burgess did admit that some iron might be earlier than the seventh century (1979, 273) his confining of the majority of the evidence to that period was immediately criticised by Barrett and Bradley (1980b, 203-204), who proposed instead a three-stage model for the introduction of the new technology. Taking account of Renfrew's observation (Renfrew, 1978) that while most diffusion models suggest that awareness of a new process is followed immediately and rapidly by its general adoption, in fact there is generally an appreciable gap between the two stages, this model proposes that the new technology was known in the Ewart Park phase, caused an adjustment in the exchange mechanisms of the bronze industry at the end of the eighth and beginning of the seventh centuries B.C., witnessed by an apparent increase in hoard deposition, and flourished in the Llynfawr period, during which time there is a marked decrease in hoard evidence. It is an exciting hypothesis because of the relationship it suggests between the emergent iron industry and the Ewart Park industrial tradition, and one to which we will return..

One further important consequence of Champion's work occasioned by his dismissal of invasion as the cause of the adoption of iron, was that it stimulated enquiry into other mechanisms of change and the effects of the new technology on the economic and social conditions of the period. He himself favoured an economic explanation - the necessity of satisfying an increasing demand for tools and weapons, a demand which could not easily be met within existing networks of supply and production - setting the highly industrialized later bronze industries

against a wider background of expansion and intensification in land-use, settlement patterns and ceramic technology. The change to a widely available metal, whose manufacture did not involve intricate and far-flung exchange mechanisms, and which produced tools and weapons at least as hard as their bronze predecessors, was thus seen to be advantageous.

Other views followed; in 1979 Burgess argued for the deliberate dumping of surplus bronze scrap in the late Ewart Park phase early in the seventh century, bronze having been relegated to a secondary role with the advent of iron (1979, 275). Bradley (1980, 69-70) countered Champion's economic argument by referring to Northover's observation (1980b, 67) that a fresh source of ingot copper was still available in the Late Bronze Age - an observation which will be examined later in greater detail as it is of importance to my own model for this period - posing instead a social interpretation which saw iron as filling a gap in the market for prestigious metalwork, overproduction of bronze having caused a decrease in its value, while Rowlands argued (1980, 46) that hoard deposition was a means of bolstering up the waning value of bronze by deliberately removing quantities from circulation. Avery, too, has considered the relationship between the two industries (Avery, 1979, chapter 19) proposing a highly individual hypothesis that the working of iron, slightly known before 700 B.C., was exclusively carried out during the seventh century by sheet-bronze craftsmen alongside their traditional tasks.

In summary, Champion's views have suggested radically new ways of considering the themes under review. His linking of that area to certain parts of Western Europe within a common cross-channel province casts a new light on the invasion hypothesis and the Hallstatt presence,

permits the rejection of time-lag and suggests other ways of explaining the transition to iron. Moreover, it leads us to expect that certain traits hitherto regarded as Iron Age may have originated within the Late Bronze Age, here as on the Continent; an examination of the adoption of iron in Central, Western and Northern Europe, to which I shall now turn, will show that a later Bronze Age date for its adoption here can also be countenanced, a concept which would have been both unthinkable and terminologically impossible in the Hawkesian era which formed the starting point of this review.

PART II: The Continental Background

Just as attitudes towards explaining the adoption of iron in Britain have altered radically over the past twenty years, so have they in Europe, the emphasis shifting from a purely diffusionist viewpoint to one which admits of multiple, independent origins and seeks to understand and describe the social, economic and metallurgical processes involved in technological change. This is best illustrated by turning first to a collection of papers, published in the early 1960's, devoted to the transition from Bronze Age to Iron Age in Europe; all were primarily concerned with establishing the direction in which the knowledge of iron-working had been transmitted to the area under review. In his article of 1961, "Athens and the East Hallstatt region: cultural interrelations at the dawn of the Iron Age", (A.J.A., 1961, 65, 283-97), Dr. Foltiny argued that the knowledge of iron-working, along with numerous other cultural traits, was transmitted to Greece from the South-East Aegean area and the North Balkans, a contention that was rebutted by Professor Snodgrass in that same journal in the following year (A.J.A., 1962, 408-410).

A further challenge to Foltiny's Danubian-Greek hypothesis was contained in Dr. Alexander's consideration of the adoption of iron in the Central Balkans, published in Antiquity in 1962 (123-130), in which he argued that knowledge of iron-working reached the Dalmatian coast in the eighth and seventh centuries through trade with Eastern Italy, a hypothesis rejected in turn by Foltiny two years later (1964, 256-7). That same year, Dr. Berciu, building on work by Gallus and Horvath (1939) and Kossack (1954), argued that the knowledge of iron-working was transmitted to the Carpatho-Danubian area, the North-West Balkans and Central Europe by pre-Scythian nomads moving west from the Ponto-Caucasian region (Arch. Rozh., 1964, 264-79); subsequent research, documented by Powell (1976, 5-13) has led to a toning down of Berciu's idea of invasive "cavaliers préscythiques" to a viewpoint which conceives of long-established "steppeland influence" and "cultural interrelationships". Finally, Professor Piggott, in a review of several of the foregoing articles (Antiquity, 1964, 300-3) argued for the existence of two routes for the introduction of iron technology into Europe, the first stemming from Asia Minor and the Levant, and responsible for transmitting the new technology to Greece in the eleventh and tenth centuries, the second Berciu's Cimmerian route.

Little, if any, consideration is given in these papers to the reasons for the change in technology, the means by which it was effected or the social and economic consequences - though Berciu remarks in passing that "l'adoption d'un nouveau metal allait bouleverser profondément la vie sociale et économique de l'Europe (et c'était) un saut qualitatif dans la marche de l'humanité vers la civilisation" (1964, 277 and 165) - nor are technological aspects investigated,

iron being generally, and erroneously, assumed to have ousted the supposedly inferior metal exceedingly swiftly; instead, the concern is with problems of chronology and diffusion.

The work of two authors will serve to illustrate the change in approach which has occurred during the 1970's, the first being Professor Snodgrass' examination of the adoption of iron in Greece and the Aegean, contained in The Dark Age of Greece (1971) and more recently in a chapter in The Coming of the Age of Iron (1980, 335-374). Not only did he examine conventional aspects of the introduction of iron metallurgy in this area - its date, source and sequence - but also such concerns as the manner and duration of the transition from bronze to iron, the respective advantages and technologies of the two metals and even the definition of the term "Iron Age": for him, that period in which "iron supersedes bronze as the normal material for those functional metal objects for which bronze was suitable" (1971, 228). Moreover, rather than assuming a swift and simple transition from bronze to iron as many had done - Montelius (1913, 289-330) and Przeworski (1939, 175-187) are notable exceptions - he proposed a three-stage model for the development of iron technology, with iron being used first as a semi-precious metal for ornamental, or at least non-functional, purposes, then for functional purposes but to a lesser extent than bronze, and finally as the predominant "working" metal. Such a model draws attention to the range of factors that must be taken into account when considering the spread of early iron-working - technical, commercial, economic and political - and demonstrates the simplistic nature of previous explanations; as Snodgrass concluded,

"Under these conditions, universal generalisations become difficult and even undesirable. Certainly the old statements often made in a deterministic vein seem today quite unjustified. The introduction of iron was far too complicated a process to have a direct effect on the known events of history; but in the longer term it did have economic, social and even historical effects."

(1980, 368-9)

The aspect of his work to which I wish to draw particular attention is his consideration of the reason behind the conversion to iron technology in the Middle Protogeometric period (late eleventh-early tenth centuries B.C.) in Attica and elsewhere in the Aegean. Contrary to previous opinion, he argued that this was from necessity rather than choice, positing the existence of some form of constraint on the use of bronze which forced people to turn to the alternative and more readily-available resource (an argument which he supported with the contention, to be discussed below, that early iron products were not superior to their bronze counterparts). During the late eleventh and early tenth centuries, trade between mainland Greece and the East Mediterranean decreased markedly, consequent on the well-attested political turmoil in this area from the late thirteenth century onwards, so much so that Snodgrass terms the phase "a blank period" and "a period of isolation". Not only did exotic materials such as gold, amber, ivory and faience fail to reach Greece at this time, but supplies of copper and tin, basic commodities upon which the bronze-using economy depended, and which he viewed as coming primarily from Cyprus, (1971, 251) were also restricted.

While his argument has been criticised - both Desborough and Waldbaum object to his treatment of the Cypriot evidence, the former seeing not a dearth but rather a resumption of contact between Attica

and Cyprus at this time and hence arguing that choice, not necessity, was the determining factor, the latter refusing to accord Cyprus primacy in the transition to iron technology and to accept the premises that she was the supplier of tin and exempt from the disruptions in the East Mediterranean - nevertheless, it is still an influential hypothesis; later I shall test the British evidence against a similar "hypothesis of bronze shortage".

The second author whose work I have selected to illustrate the recent change in approach is Dr. J. Waldbaum, who examined the development of iron technology in the East Mediterranean during the period 1200-900 B.C. in her thesis of 1968, later published as volume LIV in the series Studies in Mediterranean Archaeology (1978), and recently summarised in a chapter in The Coming of the Age of Iron (1980, 69-98). Not only did she tabulate finds of iron in Palestine, Cyprus, Greece, Crete, the Aegean islands, Syria, Anatolia and Egypt from the Early Bronze Age onwards, investigating such conventional aspects as the date and form of the earliest iron usage on the one hand and of its first extensive usage on the other, but she also examined the economic, social and political conditions under which the new technology developed, seeking to discover "whether and in what ways the introduction of iron in the several regions of the Eastern Mediterranean may be considered part of a single related phenomenon" (1978, 11). In doing so she investigated, and disproved, several little-questioned assumptions: that iron was superior to bronze right from its inception, that the transition from one technology to the other was swift, that the earliest iron was used exclusively for jewelry, and that there was a Philistine monopoly of iron production in twelfth and eleventh century Palestine. More importantly, she rejected the

hypothesis of a Hittite monopoly of iron production in the second millennium - a long-standing theory which viewed iron as having been developed only in Hittite Anatolia, knowledge of its technology being disseminated subsequent to the dissolution of that empire - by demonstrating a consistent pattern in the adoption and use of iron from the early Bronze Age onwards throughout the East Mediterranean, and supporting her case with the observation that many Bronze Age iron artefacts were "unquestionably indigenous to the regions in which they were found". (1978, 23)

Furthermore, she refused to accept diffusionist explanations for the adoption of iron in the East Mediterranean; the consistent pattern referred to above militated against this, leading her to seek an underlying economic reason. Instead, she followed Snodgrass in positing the hypothesis of a shortage of metal and disruption in trading networks consequent upon the turmoil in this area in the late thirteenth and twelfth centuries. Contrary to that author, however, she argued that it was not a shortage of copper that caused the change to the new resource - abundant local sources could have been exploited at a time of isolation - but rather of tin.

"It is tempting to see in these events and their aftermath a situation in which the main supply link to the eastern source of tin was cut. With unreliable or reduced access to an important raw material such as tin, the peoples of the Eastern Mediterranean had little choice but to turn to the material nearest to hand - and that material was iron."

(1978, 72-3)

It is a hypothesis with which Catling (1964, 298), and Maddin, Muhly and Wheeler (1977, 122), would concur; indeed, Snodgrass himself has since altered his argument to the extent that tin, rather than copper, is now specified.

Such descriptions of Snodgrass' and Waldbaum's work, however summary, demonstrate the change in approach in the study of the adoption of iron technology that has occurred in the last decade. No longer are questions of chronology and diffusion considered to be of paramount importance, no longer do historical "explanations" suffice; instead a broader approach is favoured, one which, while still treating questions of chronology and contact, also examines such vitally important aspects as the manner of, reasons for and effects of the transition - in short, the entire social, economic and technological background.

Though regrettably few authors have studied the adoption of iron in Central, Western and Northern Europe in the same laudable manner as Snodgrass and Waldbaum, nevertheless the evidence itself has been well-documented; recent general discussions are contained in the works of Powell (1976), O'Connor (1978), Coles and Harding (1979), Pleiner (1980) (though dating to 1975), Champion (1980a) and Haefner (1981), while numerous regional surveys, referred to below as appropriate, have also been published. Rather than simply summarise the catalogues presented in these articles, I shall concentrate on examining the evidence for the use of iron in Bronze Age contexts in Central, Northern and Western Europe, seeking to establish whether it is possible to agree with Professor Bouzek's recent contention that

"Paul Reinecke das richtige Gefühl hatte, wenn er seine Ha A-B Stufen mit der Eisenzeit in Verbindung brachte".

(1978, 14)

In doing so it will be necessary to refer to an accepted broad chronological framework; that to which I shall adhere is set out below.

Sandars' carefully argued revision of Müller-Karpe's chronological scheme, building on work by Close-Brooks (1967) and Moszolics (1971), in which she places Bronze D in the twelfth century and Hallstatt C in the eighth (1971, 25), has not been widely adopted - though recent work (Coles and Harding, 1979, 379 and 385; Harding, 1980, 181) has suggested that both the long-catechismic date of 700 B.C. for the start of Hallstatt C (Dehn and Frey, 1962) and that for Bronze D (Müller-Karpe, 1959) ought indeed to be reviewed - hence my usage of the latter system. The correlation of the Central European and Montelian systems follows work by O'Connor (1980, 32).

Table 1:

B.C.	Central Europe	Northern Europe
1300	Bronze D	MII/III
1200	HaA1	MIII
1100	HaA2	MIII/IV
1000	HaB1	MIV
900	HaB2	/
800	HaB3	MV
700	HaC	MVI
600		

Table 2 (page 23) summarises the evidence for iron metallurgy, both artefacts and metallurgical debris, in Bronze Age contexts in Central Europe (comprising Central and Eastern Germany, Poland, Switzerland, Austria, Hungary, Czechoslovakia and Romania); the data was compiled from regional reviews published by the following authors: Sprockhoff (1930), Kostrewski (1958), Rusu (1963), Kimmig

TABLE 2:

Key: A Austria | Bu Bulgaria | H Hungary | P Poland | S Switzerland | Y Yugoslavia
 B Bohemia | C Germany | M Moravia | R Romania | U Ukraine

Sites	TYPES	Bronze and iron pins	Pins	Rings	Bracelets	Fibulae	Awls	Chisels	Razors	Axes	Knives	Bronze and iron knives	Daggers	Bronze and iron daggers	Swords with iron inlay	Swords with iron blades	Spearheads of bronze and iron	Spearheads	Bars	Anvils	Sickles	Horse gear	Miscellaneous Debris	Period
BOBDA, R.																								
SUCHDOL, B.																								
TIROL, R.																								
LAPUS, R.																								
ROZAVLEA, R..																								
SUSANI, R.																								Hallstatt A ₁
MLADÁ BOLESLAV, B.																								
BANAT, R.																								
SUNCUIUȘ, R.																								Hallstatt A ₁
COLDAU, R.																								
COLDÄU, R.																								
HOTTING 25, A.																								
HOTTING 29, A.																								
VOLS 31, A.																								Hallstatt A ₂ /B ₁
VOLS 37, A.																								
NIEDZIELSKA, U.																								
HRADEC KRALOVE, B.																								
STANKOVICE, B.																								
GINSHEIM, G.																								Hallstatt B ₁
BABADAG, R.																								
CERNAT, R.																								
HIDA, R.																								
BİRLAD, R.																								Hallstatt B ₂
STOICANI, R.																								
WILANOWIEC, P.																								
ZURICH ALPENQUAI, S.																								
MORIGEN, S.																								
GROSSENGSTINGEN, G.																								
ALSENBN, G.																								
MEZOCST, H.																								
HIRSOVA, R.																								
HOSTOMICE, B.																								
PAWLOWO, P.																								
HADERSDORF, A.																								
STILLFRIED, A.																								
WROCLAW, P.																								
SOMARTIN, R.																								
ST KANZIAN, Y.																								
GAMOW, P.																								Hallstatt B ₃
NIDAU, S.																								
SOUS, B.																								
ERLINGSHOFEN, G.																								
UNTERKRUMBACH, G.																								
BRUCK, G.																								
NEUDECK, G.																								
KISKÖSZEG, Y.																								
PANČOVA, Y.																								
SINGEN, G.																								
WITKOWO, P.																								
CZYTE, P.																								
PODOLI 32, M.																								
PODOLI 24, M.																								
BRNO OBRANY, M.																								
PODIVIN, M.																								
KELHEIM, G.																								
MARIA RAST, Y.																								
MUTENICE I, M.																								
BRESLAU GRABSCHEN, P.																								
STILLFRIED, A.																								
INSULA BANULUI, R.																								
GRĂNICESTI, R.																								
TUSNAD, R.																								
PORUMBENII MARI, R.																								
MARIA RAST, Y.																								
TRUSESTI, R.																								
PODOLI 51, M.																								
ALEXANDROVO, Bu.																								
HORNILIDEC, M.																								
STRAMBERK, M.																								
GALITA, R.																								
MARBURG, Y.																								
MORIGEN, S.																								
BRNO OBRANY 169, M.																								
BUJORU, R.																								

Hallstatt B
undifferentiated

(1964), Podborsky (1970), Horst (1971), László (1975 and 1977), Powell (1976), Bouzek (1978) and Pleiner (1980). I do not pretend that this table is complete, nor is that which follows; rather, my aim is to present sufficient data from which to sketch the development of iron technology throughout these areas.

Though the purpose of Table 2 is to preclude discussion of individual finds, those from Vorwohlde, Lower Saxony and Ganovce, North Slovakia, demand particular attention by virtue of their early contexts. The most detailed discussion of the former is that by Sprockhoff, "Hügelgraber bei Vorwohlde im Kreise Sulingen" (Präh. Zeit., 1930, 193-236), while further considerations are contained in the following works: Pleiner (1962, 48 fig. 7, vi), Bergmann (1970, 66) and Jacob-Friesen (1974, abb 371, 391). "Complex B" of a group of barrows comprised five burials, a primary and four secondary inhumations, all associated with grave goods; those found with the primary burial included flint artefacts, a wooden vessel and an Early Bronze Age nicked flanged axe, while from the same level higher up in the mound came a riveted Sögel dagger and a fragmentary iron ring. Chemical analysis showed the latter to be of smelted iron. The unique nature of this find and its early date - the axe and dagger can be securely linked to the Sögel horizon, currently dated to Reinecke B (O'Connor, 1980, 20-22, based on Laux's scheme) - have led to it being considered an import from the South-east; Jacob-Friesen, for example, argued for an Anatolian origin (Jacob-Friesen, 1974, 390).

The most detailed description of the second find is that by Vlček and Hájek, "A ritual well and find of an Early Bronze Age iron dagger at Gánovce, near Poprad" (1968, 427-39), while further references are contained in the following works; Pleiner (1962, 48, fig. 7, V), Vlášar

(1973, 294 and 321) and Bouzek (1978, 13). In layer 3 of a two-metre deep ritual well of the East Central European Otomani culture (Reinecke A2/B1) was found a cluster of metal artefacts: two bronze coiled rings (Únětice Noppenringe) cemented with blue glass beads, a fragmentary bronze disc, a bronze mounting, two bronze buttons and a gold ring of spirally wound wire. Associated with these, in fact rusted onto them, was a crescentic flanged dagger handle of smelted iron, pierced by bronze-cladded conical rivets. This, too, has been seen as an import; in his seminal study of connections between East Central Europe and the Mediterranean in the Bronze Age, Vladár states that the dagger was undoubtedly ("ohne Zweifel", 1973, 294) an import from the Near East. Recently a radiocarbon date of 1465 ± 35 b.c. (GrN 7319) has been obtained from wood lining the well, but in view of the lack of details about the nature and provenance of the sample (Butler, 1976, 431; Coles and Harding, 1979, 110-111; Harding, 1980, 182) and of the possible longevity of use of the monument, this ought not to be applied directly to the iron¹.

One important category of evidence which could not be included in Table 2 must be mentioned. Following Drescher's study of the traces left on bronze by bronze and iron punches and engraving tools, Professor Bouzek has claimed that

"Die HaB1 - Zeitlichen Bronzen wurden in der Regel immer mit Hilfe von Eisenwerkzeugen verziert
Dasselbe trifft für einen Teil der HaA2 - zeitlichen
Bronzegegenstände zu".

(1978, 12-13)

¹ Another recently obtained C14 date from Central Europe which does pertain directly to a find of iron is that from a pit in the L.B.A. - E.1.A. settlement at Hascherkeller, Bavaria, currently being totally excavated (Wells, 1979; 1980). A bulked sample of wood-charcoal from a layer which contained a cylindrical piece of iron (J.F.A., 1980, fig. 10.2, 319) gave a date of 2830 ± 120 BP (Beta 1262) [Cal. according to Clark, 1975, 810-1438].

Few iron chisels, those tools which he deemed most appropriate for such work, have been recovered from Urnfield contexts in Central Europe, but I do not think this invalidates his case; several reasons for the lack of evidence can be suggested, such as the size and unprepossessing appearance of such tools, and their similarity to other types such as pins, awls and needles, leading to misidentification; moreover, unlike some arguments based on absence of evidence, Bouzek's can be checked, both by wear analysis and by experiment. Nor is he alone in arguing for the use of iron decorating tools in the Bronze Age; similar work has been carried out independently on British material (Savage: ref. in Hawkes, 1976a, 62, 68; Lowery, Savage and Wilkins, 1971, 170) and it has recently been suggested that the sharply-edged decoration on a socketed spearhead from the Watford Carp's Tongue hoard (Cassiobridge Farm, Herts.) was effected by an iron tool (Coombs, 1979, 205).

The first conclusion which I wish to draw from the data presented in Table 2 concerns the use of iron in Bronze Age contexts. One of the assumptions which Waldbaum countered in her study of early iron metallurgy in the East Mediterranean (see above, page 19) held that the earliest iron was used chiefly for ornamental purposes. Having listed the evidence for the use of iron in Bronze Age contexts she observed,

"Table II.2 shows that despite the common assertion that early iron is used primarily for jewellery, there are nearly as many tool types and a good number of weapon forms. It can be seen that early workers in iron in several areas experimented with a variety of forms and did not always limit themselves to simple rings and bracelets".

(1978, 22-23)

Such a conclusion can be applied with equal validity to the material from Central Europe, with regard to which the same assertion has been prevalent for too long. This is not to deny that there was an increase in the production of functional types - swords, spearheads and axes - in Hallstatt B3, testifying, as Powell observed, to "an improving supply of iron, and a surer knowledge of its properties" (1976, 4); on the contrary, that is plainly demonstrated by the table. Nor is it to deny that certain Bronze Age tools and weapons were intended for ritual or votive, rather than practical, use - for example, the dagger from Gánovce, the sword and spearhead from the Sous cremation, perhaps even the axe and anvil from the Niedzieliska hoard. What is clear, however, is that even in Hallstatt A1, iron was being used to produce functional tool and weapon types, as seen in the slender parallel-sided socketed axe from Tumulus 1/1967 at Lăpuș (Ha. A1), the flange-hilted sword from Banat (Ha. A2/B1: for the controversy over dating, see László, 1977, 59), the trunnion and socketed axes from Coldau (Ha. A/B) and the iron flanged hilt, probably part of a knife, from the hoard at Rozavlea (Ha. A1).

My second observation concerns the production of iron in Central Europe. Though I argued above (page 21) that some recent work, notably that by Snodgrass and Waldbaum, embodies new approaches to the study of early metallurgy, sadly many authors still adopt a rigidly diffusionist stance, eschewing the concept of autochthonous development and disregarding evidence of local production. Thus Pleiner (1980, 375-384) conceives of European iron-working, be it the isolated objects in second millennium contexts, the occurrence of artefacts in Hallstatt A and B contexts in South Alpine or Lower Danubian Europe, or the Caucasian evidence, as being stimulated by the Greco-Aegean and Near

Eastern worlds, encapsulating his attitude in a distribution map worthy of Elliot-Smith (fig. 11.2). Similarly, Podborsky has remarked,

"Eine lokale Eisenerzeugung bereits in der späten
Bronzezeit ist für Mitteleuropa völlig unwahr-
scheinlich"

(1970, 176)

In an attempt to redress the balance from such a rigidly diffusionist view, three categories of evidence merit consideration: the metallurgical debris from sites in the Dobrogea, the conjunction of bronze metallurgy both therein and elsewhere, and the copying of bronze forms in iron. With regard to the first point, five Bronze Age sites in the Lower Danube contain evidence of ironworking. At Babadag, Kr. Tulcea, both finished and unfinished artefacts were found, as well as raw material in the form of an iron bar, in a level belonging to "la phase moyenne" of the settlement's long occupation, Babadag II or Ha. B1-B2 (Morintz, 1964, 118; but for alternative phasing, see Berciu, 1967, p. 109, fig. 51). Fragments of iron slag were found in the settlements at Hirşova and Galiţa, Kr. Constanţa, in Ha. B1-B2 and Ha B2-B3 contexts respectively, perhaps indicating on-site ore reduction, while further specimens were found in a Ha. A context within the area surveyed at Susani, Kr. Timiş. The abundance of metallurgical debris found around the hearth in a hut within the settlement of Cernat, Kr. Covasna (Babadag II levels) - finished and unfinished artefacts, unworked iron bars, chalk lumps, slag, charcoal and other signs of burning - led Székely to interpret the building as an iron foundry (Székely, 1966, 218); elsewhere on the site there was evidence of contemporary bronze-working (in the form of a fragmentary stone mould), while from the same hut came a crucible and bronze-casting waste,

testifying to the working of the two metals if not by the same craftsman, at least within the same workshop. The close conjunction of the two metallurgical traditions is further attested by such bimetallic artefacts as bronze pins, razors and bracelets with ornamental iron inlay, and by bronze Mörigen and Rundknauf swords with iron inlay on their hilts. As far as the third category of evidence is concerned, this is best exemplified by the iron socketed axes; as László wrote,

"Das Beil von Lăpus zeigen wohl das man versucht hatt, diesen charakteristischen Typus des Bronzehandwerks mit der neuen Technologie der Eisenbearbeitung herzustellen."

(László, 1977, 62)

In detailing such evidence I am not advocating that the diffusionist viewpoint castigated above be replaced by an equally rigid attitude, one which views all innovation as autochthonous, for as Muhly has recently commented with regard to the development of copper metallurgy, such an "extreme reaction" does not advance our subject (1980, 30); rather, I am attempting to show that we should no longer assume that all iron artefacts in Bronze Age contexts in Central Europe were imports from the south and south-east, and ought instead to turn our attention to studying the relationship between the new technology (however originally inspired) and the old, the sources of the raw material, and questions of production and distribution.

Table 3 (page 30) summarises the evidence for the use of iron in the Bronze Age in Northern Europe - the North European Plain from the Ems to the Oder, and Scandinavia - and was compiled from the following regional surveys: Montelius (1913), Sprockhoff (1930), Arbman (1934), Broholm (1946), Baudou (1960), Sternquist (1961) and Kimmig (1964); it is both subject to the same limitations, and designed for the same

TABLE 3:

Key: B Brandenburg H Hannover M Mecklenburg S Sweden
D Denmark J Jutland P Pomerania S.-H. Schleswig-Holstein

Sites	TYPES	Bronze and iron pins	iron pins	Rings	Bracelets	Awls	Chisels	Razors	Axes	Knives	Bronze and iron knives	Daggers	Bronze and iron daggers	Swords with iron inlay	Swords with iron blades	Spearheads of bronze and iron	Spearheads	Bars	Anvils	Sickles	Horse gear	Miscellaneous Debris	Period
GRÖDEBY, D.																							
ARNITLUND, J.																							M III
KJELDBYMAGLE, D.																							
ÅKER, D.																							
INSEL MOEN, D.																							M IV/V
SIMRIS grave 6, S.																							
SEDDIN, B.																							
BRODA, M.																							
KONINGSTEDT, B.																							
LUDWIGSLUST, M.																							
DERGENTHIN, B.																							
WARRINGHOLZ, S.-H.																							
SCHWERIN, M.																							
GRÜNTAL BELDORF, S.-H.																							
KEMNITZ, B.																							
LANCKEN, M.																							
ALBERSDORF, S.-H.																							
GREVENKRUG, S.-H.																							
TELLINGSTEDT, S.-H.																							
ZÜLOW, M.																							M V
BORKOW, M.																							
WENN BUTTEL, S.-H.																							
DITHMARSCHEN, S.-H.																							
REDENTIN, M.																							
BILLERBECK, P.																							
NORBJAR, S.																							
SJOGESTAD, S.																							
BJARSGARD, S.																							
LOHE, H.																							
STUBBENDORF, M.																							
ST MICHAELISDONN, S.-H.																							
RÄBELOV, J.																							
SIMRIS grave 57, S.																							
JARRESTAD, S.																							
VESTER, J.																							
HOESTRUP, D.																							
LUTTUM, H.																							
VALLBY, S.																							
ROGERUP, D.																							
OURE SVENDBORG, D.																							
FANEFJORD, D.																							
RANDBØL, J.																							
KRUBBEBACKEN, S.																							M VI
FOGLESBØLLE, D.																							
HINDSTED, D.																							
NØRVANG, D.																							
TØRRILD, D.																							
KOLPIN, P.																							
VRETAKLOSTER, S.																							
HOLSTEIN, S.-H.																							
ESKELHELM, S.																							
ULSTRUP, D.																							
ANNELOV, S.																							

purpose, as Table 2. Finds from Montelius VI contexts have been included, for although this phase is contemporary with Ha.C and part of Ha.D in Central and Western Europe (Baudou, 1960, 137-8), in Scandinavia and North Germany it represents the latest Bronze Age (Baudou, 1960, 138; Jacob-Friesen, 1974, abb. 324)¹.

As before, the earliest finds merit particular attention. Two iron artefacts have been found associated with Period III bronzes in South Scandinavia, the first being an iron knife from a short cist in the cemetery at Grodeby, Bornholm (Sternquist, 1961, 78; Kimmig, 1964, 277). On the basis of bronze corrosion found on the surface of the knife, Montelius (1913, 316) argued that it was contemporary with the accompanying bronzes - but such evidence is inconclusive; it is unfortunate that such an early find should have been excavated in 1885 under unscientific conditions (Sternquist, 1961, 78). The second consists of an iron knife from a grave at Åker, Denmark, found with a dagger with rhombic pommel, a frame-hafted knife, a ring-headed brooch and a narrow razor. Despite such associations, Randsborg (1972, 42, note 121) has dated the find to Period IV, arguing that because iron is unknown in Europe in Reinecke D and Ha.A1 (sic.) "it will be most natural to date the grave late, that is to Ha.A2/Period IV".

Only one find can definitely be dated to Period IV, namely the iron pin found with a bronze knife in a grave on Møen, Denmark. Sternquist has questioned the ascription of the two razors inlaid with

¹Nylen (1974, 104) would prefer to see the transition from Bronze Age to Iron Age occurring c. 300 B.C. "Der Übergang zwischen Bronze und Eisenzeit ist, rein Kulturell betrachtet, vielleicht nicht zwischen der jüngsten bronze-zeitlichen Periode VI und der ältesten eisenzeitlichen Periode I (oder Jastorfstufe) zu sehen, sondern besser spürbar in der Mitte der vorromischen Eisenzeit (Periode II oder Ripdorfstufe)."

iron from graves at Kjeldbymagle (Den.) and Arnitlund (Jut.) to Period IV (Baudou, 1960, 313), not only on the basis of their associations, which could equally be assigned to Period V, but also because the tradition of inlaying with iron in Central Europe dates to Ha. B3 (though found there on knives, swords and pins, and not on razors). With regard to the latter argument it should be noted that the Arnitlund razor is also inlaid with gold, a technique used on North European Vollgriffschwerter from the Earlier Bronze Age; if the southern derivation of this technique can be questioned, so too can the chronological equation.

I think it is reasonable to infer from the evidence listed above that iron was treated as a precious metal during Periods III and IV; its rarity, use as an inlay and inclusion in graves which contain numerous other artefacts surely testify to this. In Period IV, however, a change occurred, with iron being used not only as an inlay or for small, decorative items, most noticeably pins, but also for the functional parts of tools and weapons - for example, the spearhead from Breesen Quellendorf, the iron-bladed swords from Billerbeck, the binding around the Prenzlawitz amphora, or the numerous tanged and socketed knives from Scandinavia. Though this testifies to an increase in the use of iron and a development in technology, it is impossible to point to any accompanying change in the metal's status, as the majority of finds derive, as before, from graves, some of which were both richly equipped and of splendid construction (notably the Königsgrab, Seddin).

It is difficult to argue against the widely held belief that the period V artefacts from Northern Europe were imports from further south (Sternquist, 1961, 78; Horst, 1971, 193) given the lack of evidence for local ore extraction, metal production or the copying of

indigenous types - a scrap of raw metal from cremation grave VI at Simris found with a Period IV-V razor and shown by analysis to be iron (Sternquist, 1961, 77-78, Pl. XIV, 2; Kimmig, 1964, 281), and slag from Lenzersilge, Kr. Perleberg and Freyenstein, Kr. Wittstock¹; such evidence does not appear until Period VI (for the copying of local types see Baudou, 1960, and for local production, Horst, 1971, 197). In view of the increase in the range and number of iron products, and of the improvement in technology, which occurred during this phase, Montelius concluded

"Während dieser Zeit ist das Eisens bereits in so allgemeinen Gebrauch, waffen und Werkzeuge aus Bronze aber so selten geworden, dass die Periode eben sowohl oder noch besser die erste eisenzeitliche genannt werden kann".

(Montelius, 1913, 318)

I have not produced a table similar to those above detailing the evidence for the use of iron in Bronze Age contexts in North-Western Europe - France and the Low Countries - because of the imbalance in the nature of the evidence. The area has been less intensively studied than the other two, lacking both general surveys, such as those available for Central Europe - Gomez and Mohen's list in Mohen, 1980 is a notable exception - and detailed regional studies, and as my own survey of the evidence has been, of necessity, extremely cursory, it has not been possible to compile a table comparable to 2 and 3, either in terms of the quantity of evidence listed or of the chronological detail

¹ The latter two finds are singularly unhelpful; the "slag" from the Period V settlement at Lenzersilge may simply be unprocessed iron, used for building, while that from the cemetery at Freyenstein cannot be dated more accurately than "Periods IV-VI", nor has it yet been analysed.

LIST I: Iron in Bronze Age Contexts in France.

RINGS

Lac d'Annecy, Savoie
 Champigny, Aube
 Millas, Languedoc

Mohen, 1980, 46; Gomez et Mohen, 1981, 53.
 Mohen, 1980, 46; Gomez et Mohen, 1981, 54.
 Taffanel, 1958, 138-70.

BRACELETS

Lac de Bourget, Savoie
 Aulnay aux Planches, Marne
 Chaumes d'Auvenay, Côte d'Or
 Las Fados, Pépieux, Aude

Mohen, 1980, 46; Gomez et Mohen, 1981, 53.
 Brisson et Hatt, 1952/3, 212.
 Kimmig, 1964, 279.
 Taffanel, 1958, 128-9; fig. 106, 117.

PINS

Chindrieux, Lac de Bourget, Savoie

Boquet, 1976; Mohen, 1980, 46; Gomez et Mohen, 1981, 53.

FIBULAE

Millas, Languedoc

Taffanel, 1958, 138-70.

AWLS

Petit Villatte, Cher

Mohen, 1980, 46; Gomez et Mohen, 1981, 54.

ARROWHEADS

Camp de la Montagne, Côte d'Or
 Grandes Chapelles, Indre
 Quéroy, Chazelles, Charente
 Sarraaltroff, Moselle
 Millas, Languedoc

Mohen, 1980, 46; Gomez et Mohen, 1981, 53.
 Mohen, 1980, 46; Gomez et Mohen, 1981, 53.
 Gomez *et al.*, 1978.
 Mohen, 1980, 46; Gomez et Mohen, 1981, 54.
 Taffanel, 1958, 138-70.

KNIVES

Las Fados, Pépieux, Aude
 Lac de Bourget, Savoie
 Quéroy, Chazelles, Charente

Taffanel, 1958, 93.
 Mohen, 1980, 46; Gomez et Mohen, 1981, 53.
 Gomez *et al.*, 1978.

INGOTS

Lac d'Annecy, Savoie

Mohen, 1980, 46; Gomez et Mohen, 1981, 53.

SWORDS

Chavéria, Jura
 Vescles, Jura
 Millas, Languedoc
 Velluire, Vendée
 Cahors, Lot

Mohen, 1980, 47; Gomez et Mohen, 1981, 54.
 Mohen, 1980, 47; Gomez et Mohen, 1981, 54.
 Taffanel, 1958, 138-70.
 Mohen, 1980, 47; Gomez et Mohen, 1981, 54.
 Mohen, 1980, 47; Gomez et Mohen, 1981, 54.

MISCELLANEOUS

Vénat, Charente
 Choisy au Bac, Oise
 Carbon, Arège
 Champigny, Aude
 Le Moulin, Aude

Coffyn, Gomez et Mohen, 1981.
 Blanchet et Toupet, 1977; Mohen, 1980, 46.
 Mohen, 1980, 46; Gomez et Mohen, 1981, 54.
 Mohen, 1980, 46; Gomez et Mohen, 1981, 54.
 Gomez et Mohen, 1981, 54.

accorded to that evidence. Instead, I shall describe what little evidence there is in summary fashion, listing that for France separately in List 1 (page 34).

The Gronigen radiocarbon laboratory has recently published four determinations which testify to the use of iron in Bronze Age contexts in the Low Countries (Lanting and Mook, 1977, 124, 127 and 143; Brongers and Woltering, 1978, 97), the earliest being two dates from the southern plank footpath in a peat-bog at Bargerosterveld, Drenthe: GrN 4149; 3120 ± 50 b.p. and GrN 4342; 3145 ± 55 b.p., the latter coming from the outermost annual rings of an oak plank. On the trackway lay a small iron object, to which Bouzek naturally ascribed the term "chisel" (1978, 9) and Butler those of "punch" or "awl" (1976, 431). Analysis has shown that the object was forged from a bog iron ore, and it should be noted that the trackway leads to a deposit of siderite, a strong argument for the local manufacture of this tool (Butler, 1976, 431). Charcoal from a pit within House 13 in the Middle Bronze Age - Late Bronze Age settlement at Emmerhout, Angelslo, apparently associated with iron slag, yielded a date of 3090 ± 60 b.p. (GrN 5775), while charcoal from a pit found during sand extraction operations at Lenthe, Dalfsen, again apparently associated with iron slag (Brongers and Woltering, 1978, 97) produced a date of 2785 ± 35 b.p. (GrN 6331)¹.

The evidence from France for the use of iron in the Bronze Age comes from a variety of contexts, hoards, burials and settlements, and

¹ The Dutch finds have been described as "dating as early as the twelfth century B.C." (Champion, 1980a, 513). However, despite the upper case notation used (Lanting and Mook, 1977) these are conventional C14 dates - hence the description of GrN 4149 as "dating to 1170 b.c." (Coles and Harding, 1979, 534; Butler, 1976, 431). Calibration of these dates therefore means that the use of iron could lie as early as the 14th century B.C. (Ralph *et al.*, 1973) or even the 15th century B.C. (Clark, 1975).

apart from five iron sword-blades and two socketed axes (four of which were stray finds) comprises small and generally decorative artefacts dating mainly to Bronze Final III (equivalent to Hallstatt B₃). It is interesting to observe that when Brisson and Hatt published the account of their excavations at the multiperiod cemetery at Aulnay aux Planches, Saint Gond (Marne), the presence of iron in cremation B12 necessitated the ascription of a Hallstatt C-D date to that context (1953, 212); however, Chertier, writing within a climate of opinion which generally admits of iron in Later Bronze Age contexts in France - though Avery has expressed doubt on this issue (1981, 49) - has recently placed this find in his Ultimate Urnfield phase, CUIII/Ha B₃.

Only two bronze hoards contain iron objects, those from Petit Villatte, Neuvy-sur-Barangeon (Cher), and Vénat, St Vrieix (Charente) (Inv. Arch., F.6; Cartailhac, 1894; Coffyn, Gomez and Mohen, 1981), the latter giving its name to the bronze industry characteristic of Bronze Final IIb in the Centre Ouest; it is to this phase that bronzes from Layers 6b-5 from the multi-period cave site at Quérois, Chazelles (Charente; Gomez, Maire and Tournepiche, 1978) belong, associated there with five iron arrowheads and a fragment of an iron knife. This site is important on two accounts: first, the associated pottery allows comparison to be made between assemblages from the Centre Ouest, sites belonging to the Mailhacien culture and sites in Switzerland, Savoie and the Rhône valley - so much so that Gomez *et al.* are led to speak of "un vaste oikumene que recouvre une large partie de la Gaule" (1978, 412) - some of which also contain iron (for example, pins from sites belonging to the "groupe des palafittes du Bourget", Boquet in Guilaine, 1976, or the iron artefacts from the Languedocien sites, see below). Secondly, charcoal from layers 5 and 6 provided a useful series

of radiocarbon dates, one of which, Gif 3775; 2730 ± 100 b.p., came from a context ("le foyer du dernier sol d'occupation reposant sur la couche 5") which contained two of the arrowheads and the fragmentary iron knife. The Mediterranean belt between the Rhone and the Pyrenees is also prolific in early iron finds, the evidence in this case coming exclusively from burials (Barruol in Guilaine, 1976, 676-686; Mohen in Guilaine, 1976, 753-760; Louis and Taffanel, 1958, *passim*) and dating to Phase I of the Mailhacien culture. Since the publication in 1958 of the excavations at Le Moulin (Languedoc), two further iron knives have been added to that already found (Mohen, 1980, 47), while the cemeteries at Las Fados, Pepieux (Aude) and Millas (Languedoc), have produced thirteen iron artefacts, including a sword - though there is doubt about its ascription to this phase (Louis and Taffanel, 1960, 373) - and numerous other fragments.

The occurrence of iron in Bronze Age contexts in Central, Northern and North-Western Europe having been described, it would seem logical to return to the question posed at the beginning of this section; namely whether such evidence justifies the application of the term "Iron Age" to Hallstatt A and Hallstatt B, as Bouzek appears to be advocating, or rather represents nothing more than "a thin scatter of small iron objects in various Late Bronze Age contexts" (Powell, 1976, 3)? No attempt will be made to answer this question here, however, for reasons which will become apparent in Chapter 3. Acceptance of the evidence *at face value* would suggest that iron was in the main treated as a high-status metal during this period, bronze remaining predominant both in terms of quantity and edge-rôle, and hence that the term "Iron Age", according to Snodgrass' and Waldbaum's definitions quoted below, should not be applied until Hallstatt C₂/D:

"The distinction between Bronze Age and Iron Age may seem an obvious one, but in fact it is always bound to be one of degree, being based on the simple proportion of iron to bronze in certain fundamental (i.e. functional) classes of object."

(Snodgrass, 1965, 230)

"The Iron Age *per se* began when iron ceased to be considered precious and was finally accepted as the predominant material for making tools and weapons."

(Waldbaum, 1980, 82)

Such a conclusion, however, takes no account of the biases of survival and discovery, nor of different contexts, factors which, as discussion of the British evidence will indicate, have a marked effect upon our understanding of the role and status of iron during the Later Bronze Age. It is hoped that the suggestions thrown out by the latter consideration will aid the formulation of sensible answers to the question posed above.

PART III: Metallurgical Topics

Having reviewed the state of research concerning the adoption of iron in Britain and summarised the evidence for the use of iron in Bronze Age Europe, I wish to conclude this introductory chapter with a brief discussion of three general topics - the "discovery" of iron, the differences between bronze technology and that of iron, and the properties of the two metals, further metallurgical topics being considered later.

Several theories regarding the discovery of the technique of reducing metallic iron from its ores have been advanced; with the demise of diffusionist attitudes the need to seek single explanations for phenomena, and especially for innovation, has receded, and thus it is now possible to argue that each of the methods detailed below may have operated. It would seem most logical to seek to connect the discovery of the new technique with an existing metallurgical tradition, and indeed, three of the hypotheses are so constructed. Two are

based on the observation that "the incorporation of several per cent of metallic iron (in copper) can be regarded as usual" (Craddock, 1980, 168), the result of using iron-rich ores, such as chalcopyrite (which, according to Maddin and Muhly's experiments, yields a slag "interlaced with copper veins and inclusions of iron" (Wertime, 1980, 15-16; Cooke and Aschenbrenner, 1975, 265; Petrescu-Dîmbovița, 1958, 67), or of adding iron oxide fluxes (Wertime, 1973, 882-3; 1980, 13-17; Tylecote, 1980, 5; Charles, 1980, 164-5). In smelting most minerals, except for the purest such as cuprite, malachite and chalcocite, it is necessary to add a compound which, by lowering the free-running temperature of the gangue, will combine with the unwanted minerals and remove them from the metal as a fusible slag. The best fluxes for the removal of siliceous matter from copper and lead ores are iron oxides, and of these, that most commonly used from the Chalcolithic onwards, was haematite. Under certain conditions, however - where there was an ample supply of both air and charcoal, and where the iron oxide content of the charge was more than sufficient to neutralise the gangue content of the ore, in short under optimum reducing conditions in a large and exceedingly hot furnace - some of the iron oxide could itself be reduced, resulting in pieces of sponge iron being found among the spent charge material, or in the incorporation of iron in the molten copper, later to be rejected through crucible remelting and resolidification (Tylecote and Boydell, 1978, 45-8). The third hypothesis posits the accidental inclusion of pieces of haematite in a copper smelt (Rickard, 1939, 86-7; Tylecote, 1962, 184; Charles, 1980, 166) owing to the similar appearance of haematite and cuprite (or even to roasted copper sulphides); such a process would result in the occurrence of molten slag at the bottom of the furnace and sponge iron among the charcoal. By these methods,

bronze workers would have become acquainted with the appearance, properties and potential of iron ores, leading to interest in, and experiment with, the metal *per se*.

Other theories that have been advanced include the suggestions that the recognition of iron's metallic properties developed from the smelting of gold sands containing iron (Tylecote, 1962, 185; Wertime, 1980, 14) from the roasting and reduction of red ochre intended for pigments and pottery decoration (Rickard, 1939; Schmandt-Besserat, 1980) and from the accidental inclusion of iron ore in a camp-fire or pottery kiln (Rickard, 1939; Coghlan, 1941, 74-80). Rickard and Coghlan's experiments have proved the implausibility of the latter hypothesis; under the oxidising conditions that would have occurred in both kiln and fire, such an accident would have resulted merely in a piece of roasted ore or, at best, of exceedingly cindery, and hence useless, metal.

Two recent considerations of the transition from bronze to iron in the British Isles - B.G. Scott's paper at the Vth Atlantic Colloquium (Scott, 1979) and chapter 19 of D.M.E. Avery's thesis on Southern British hillforts - have drawn particular attention to the shared characteristics of the two technologies; in arguing that ferrous technology was an extension of non-ferrous technology, Scott points to the percussive techniques required in the shaping of both metals, while Avery, in support of his contention that Southern British iron-working was pioneered by specialist bronze sheetworkers, likewise stresses the need for percussion hammerwork in both industries, and points to further shared techniques such as swaging, heat-treatment during manufacture, fullering and flatting (Avery, 1979, chapter 19). Forbes, on the other hand, has argued that

"the craft of the blacksmith is fundamentally different from that of the copper metallurgist".

(Forbes, 1972, 225).

Clearly, in any study of this nature it is vital to determine the extent of the industries' similarities, and it is to this topic that I now turn.

While the extraction of both copper and iron from their oxides is effected by reduction with carbon monoxide, in furnaces similarly equipped with bellows and tuyères, and while the process of roasting in moderate temperatures and oxidising conditions can be applied to iron carbonate ores and copper sulphide ores alike, nevertheless there are vital differences between the resultant products. As Tylecote has succinctly explained (1962, 183-4), it is not sufficient to heat iron ores up to 800°C, the temperature at which iron oxide can be reduced to metallic iron, as they contain other, unwanted, minerals - the "gangue"; rather they must be heated to temperatures around 1150°C-1200°C thereby allowing the contaminant minerals to drain away from the metallic iron. However, as such temperatures are below the melting point of iron (1540°C) the metal does not liquefy (as would copper in this range) but forms instead a spongy mass - the bloom - together with slag and unburnt charcoal. To remove the impurities and consolidate the iron grains, the bloom must then be heated to red heat and hammered; only then can "secondary smithing" - forging of the purified iron at a lower temperature - be commenced.

After casting in the molten state, copper and its alloys could be work-hardened by alternate hammering and annealing - heating the alloy to temperatures above the level of recrystallisation - the latter process remedying the brittleness induced by the former. As Allen, Britton and Coghlan have observed (1970, 23), Late Bronze Age artefacts were

generally cast as closely as possible to their desired ultimate form, thus minimising the need for post-casting treatment, which would be limited to local annealing and light cold-working for the purposes of cleaning the casting, consolidating the metal and increasing the hardness of the working edges. Whereas copper and bronze, being soft and malleable, could be hammered and hardened when cold, the forging of iron would have required temperatures above 800°C - cold forging being beyond the technical range of prehistoric blacksmiths - and herein lies a fundamental difference between the two technologies. It is, however, fallacious to argue that hot forging of non-ferrous metals was never carried out and that bronzesmiths consequently did not require tongs; Coghlan, following work by Voce, has shown that bronzes containing up to 6 per cent tin, can theoretically be worked hot or cold, and that forging was "quite probably attempted as a preliminary measure on bronzes containing 6-15 per cent tin" (Coghlan, 1960), while his own analyses of Irish and British implements from Newbury Museum have demonstrated that such hot-working was indeed carried out (Coghlan, 1970, 9: palstave flanges and cutting edges, 14-5; socketed axes, 21-2, 23-4). Similarly, Allen, Britton and Coghlan have argued that hot-working was responsible for welding up blow-holes on some of the heavier artefacts such as palstaves, and was also involved in the manufacture of a haft-flanged axe and a rivet (1970, 22, 24, 142 and 149), while Rowlands has pointed to the need to work bronze at temperatures above 700°C when applying certain decorative techniques, such as the manual twisting of bronze rod (Rowlands, 1976, 14, 17-18).

While the techniques of work-hardening bronze and hammering iron are theoretically identical - a change of state being induced by the application of force - in practice the styles of forging differ

markedly; it is only in the manufacture of bronze sheet that a bronze-worker forges his metal as severely as a blacksmith; thus vigorous, accurate and lengthy hammering would be required to fashion the very delicate metal (average thickness 0.50 mm: Tylecote, 1962, 149) used for buckets and cauldrons and the slightly thinner metal (0.35 mm) from which shields were made (Coles, 1962). Avery has suggested (1979, ch. 19) that the iron sickle from Llyn Fawr, Glam., was swage-hammered, and this is indeed a technique common to the two technologies; circular-sectioned bronze bars and rods were undoubtedly made in this way, and it is suggested on the analogy of contemporary Kenyan blacksmithing - a technology being one sphere in which it is surely reasonable, and safe, to range widely (chronologically, culturally and geographically) in search of enlightening parallels - that the midribs of iron spearheads and swords may also have been fashioned in this way. The following description of the manufacture of such a midrib would delight the proponents of the "sword-blade explanation" for currency bars:

"An apparently more recent method of strengthening by means of a midrib was perfected by introducing grooves into anvils. The smith beats the bar bit by bit, starting above the socket, into a rectangular cross-section. Then, using a grooved anvil of stone or iron, the smith places the bar over the groove and hammers it just off-centre so that the underside sinks into the groove while the upper-side is thinned only along its edge. This produces a midrib on both sides."

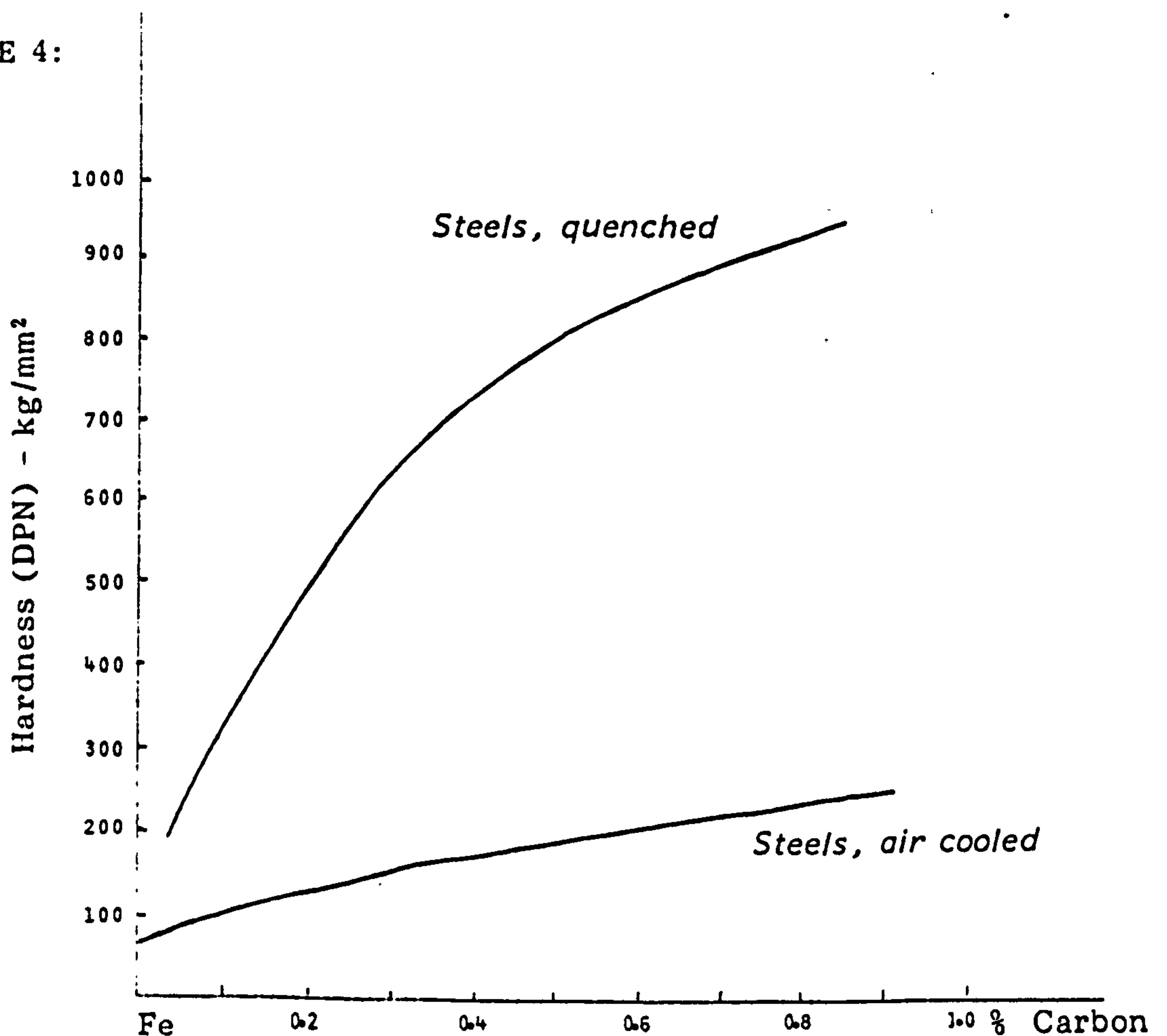
(Brown, 1980, 133-4)

Two of the blacksmith's techniques, those of carburizing and quenching, were alien to the bronzeworkers' repertoire owing to the different properties of the two metals, and hence could not have been transferred from one technology to the other. The incorporation of

carbon within iron, thereby increasing both its tensile strength and hardness (for figures, see below) can be effected in three ways: during smelting itself, when charcoal can be trapped in the pores of the iron bloom later being forged into stringers within the metal, most commonly during primary smithing, when the bloom comes into contact with white hot charcoal and carbon monoxide, and less effectively during secondary smithing, when the half-finished object is repeatedly heated in a charcoal fire. Such techniques would have had no effect on copper and its alloys, which do not absorb carbon - nor would quenching, the technique of imparting surface hardness to iron containing more than 0.30 per cent carbon by plunging it into water while red hot.

Waldbaum's diagram VI, reproduced below, as Table 4, indicates the improvement brought about by such treatment; the brittleness which this also induced could be remedied by "tempering", the reheating of iron up to, but not above, the temperature of transformation (727°C).

TABLE 4:



One topic which can only be touched on briefly here, and which is seldom discussed in considerations of the differences between the two technologies is that of scrapping. Whereas iron artefacts can be forged and reused repeatedly without the addition of fresh metal, when melting and reusing bronze it may be necessary to add a percentage of ingot copper, or certain of the other constituents such as lead or tin, to compensate for loss of weight and properties. Such an observation has crucial implications both for the interpretation of Late Bronze Age "founder's hoards" and for our understanding of the lack of pre-Roman ironwork hoards - hitherto variously attributed to the scarcity value of the metal, its extreme corruptibility and its unprepossessing appearance compared to bronze (Manning, 1972; 1981; Saunders, 1977) - and will be discussed in considerable detail later.

Although the foregoing summary has shown that there are undoubted differences between the two technologies, such as methods of smelting, manufacture and scrapping, and although industrial networks of production and distribution also differ, as will be discussed later with reference to Britain, nevertheless non-ferrous metallurgy provided the pool of expertise - in the prospection, extraction and processing of ores and the recognition of metallic properties and potential - out of which the new technology arose; as Scott has remarked (1979, 189), the process is one of "accumulation rather than substitution", "the addition of a new technology and the redirection of an old one". On a less theoretical level, I am not qualified to judge the facility with which bronzeworkers would adapt to iron, lacking as I do any practical experience with either metal, but conversations with metalworkers and metallurgists have suggested that the new skills would quickly be mastered.

Thirdly, the properties of the two metals. It is generally assumed that the earliest smelted iron was inferior to the bronzework produced in the Late Bronze Age; Snodgrass (1971, 214-217), Coghlan and Case (1957) and Forbes (1972, 225) have argued that the hardness of a well-hammered bronze exceeds that of the earliest wrought iron, while Maddin, Muhly and Wheeler consider that

"what the blacksmith had to deal with was a poor substitute for bronze. Bronze was clearly a better material than bloomery iron for the manufacture of weapons and tools".

(1977, 124)

Arguments of this nature are based on the following data; while unworked bloomery iron has a tensile strength of only 40,000 pounds per square inch (p.s.i.) and forged iron that of 100,000 p.s.i., a ten per cent tin bronze has a strength of 60,000 p.s.i. on casting and 120,000 p.s.i. after cold working.

It is, however, possible to counter this assumption and to suggest instead that "the earliest iron objects were at least as hard as their Late Bronze Age predecessors" (Champion, 1975, 142). Scott has observed (1974a, 9) that such arguments

"take no account of the uncertainties of ancient iron production which made the production of steels, however inhomogeneous, possible under certain conditions",

citing as an example the inhomogeneous carbon content in the Early Iron Age looped socketed axe from Lough Mourne which ranges from a low to a high carbon steel (Scott, 1974a, 9, 16). Phosphorus likewise imparts increased hardness - 0.6% phosphorus can double the tensile strength and hardness of the material (Coghlan, 1977, 55) - and it is

inevitable that an appreciable percentage of this metal would have been present in the earliest iron in certain regions (R. Clough, pers. comm.). Hardness, however, was not simply imparted accidentally; Northover has argued that the blades of the earliest iron cutting tools from Wales were already being intentionally carburized, notably that of the sickle from the Llyn Fawr (Glam) hoard (Northover, 1980a, 235; 1980b, 68). The addition of 0.2%-0.3% carbon makes iron equal in strength to an unworked 10% tin bronze, 1.2% carbon raises the strength to 140,000 p.s.i. and subsequent hammering increases the steel's tensile strength to 245,000 p.s.i.; as noted above, the tensile strength of a 10% tin bronze after hammering is merely 120,000 p.s.i.

Champion (1975, 141-2, figs 4 and 5) has approached the controversy from another angle, that of examining the standard of bronze production in the Late Bronze Age. Building on observations made by Allen, Britton and Coghlan in their metallographic study of British and Irish Bronze Age material (1970, 23, 25 and 26) he argued that Late Bronze Age products were "softer and more standardised" than their Middle Bronze Age predecessors. Thus, when comparing the efficacy of the two metals the essential figures to consider are the actual levels of hardness to which the bronzes were worked, rather than the seldom-attained theoretical maxima; while Middle Bronze Age artefacts averaged 122 H.B., the average figure for Late Bronze Age products was only 100 H.B., a decrease not to be attributed to increased lead levels (Allen, Britton and Coghlan, 1970, 23) but, according to Champion, to economic pressures (Champion, 1975, 142). The controversy, however, will only be resolved when a far larger number of hardness tests have been carried out on the latest bronzework and earliest iron-work from the British Isles; it is hoped that the discussion and catalogue

of the latter material contained in the following study will aid the execution of this task.

CHAPTER 2

The Iron Ore Resources of Great Britain

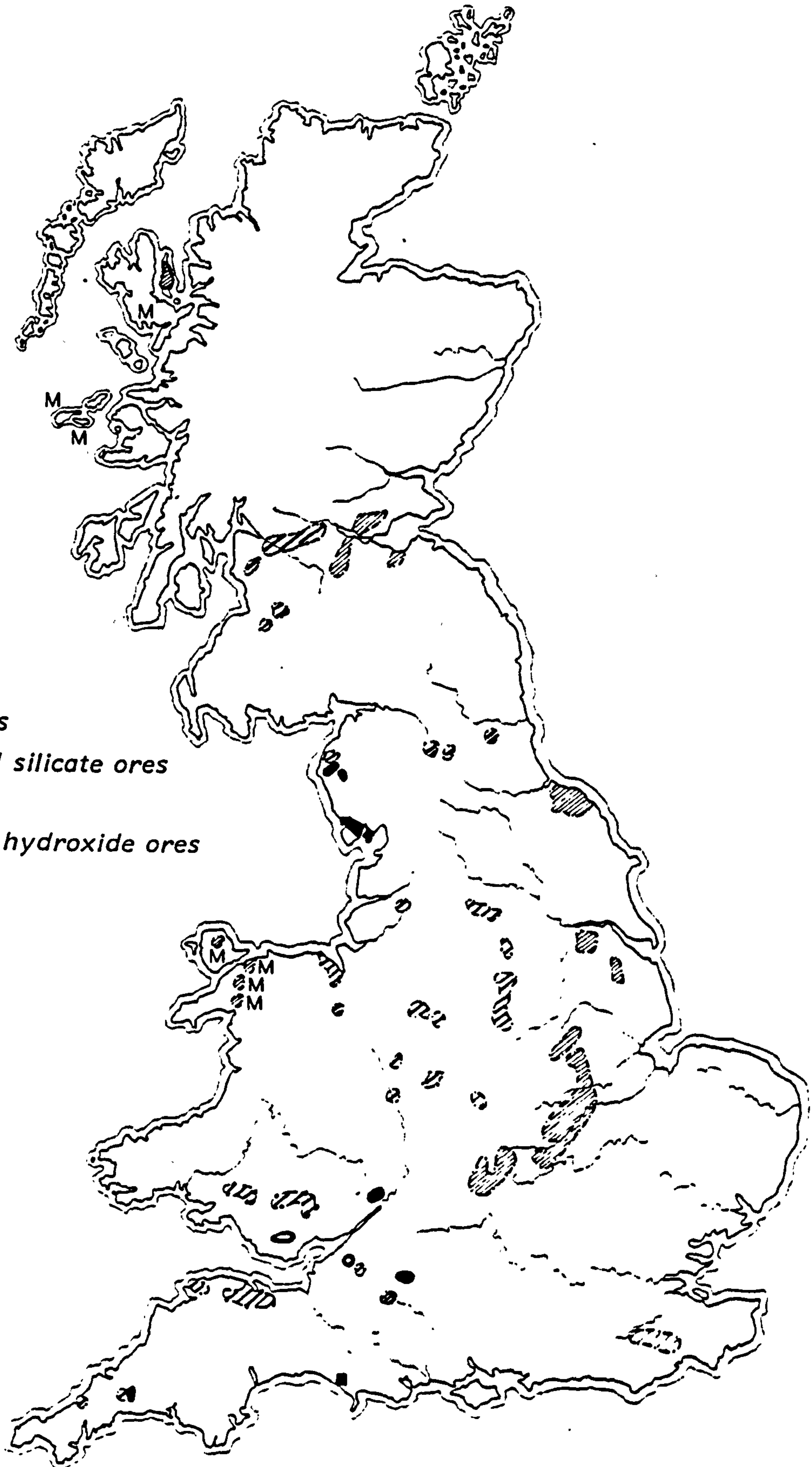
A Summary

THE PRINCIPAL IRON ORE DEPOSITS

OF GREAT BRITAIN



- 1 Carbonate ores
- 2 Carbonate and silicate ores
- 3 Haematite
- 4 Haematite and hydroxide ores
- 5 Silicate ores
- 6 M Magnetite



MAP 1

Iron is the fourth most abundant element in the earth's surface, constituting about 5 per cent of the weight of the earth's crust (Pugh, 1973, 461) and occurring in concentrations of up to 70 per cent. While it possesses several rare qualities - such as ferromagnetism and the capacity to accept carbon and other materials into interstitial solution (Wertime, 1980, 6-7) - the two traits to which I wish to draw particular attention are those of the abundance and widespread distribution of ferrous, relative to non-ferrous, ores; that such characteristics obtain equally in the British Isles will be evident from the discussion provided later in this section.

Iron occurs most often in combination with oxygen, carbon and sulphur, and on this basis can be divided into three categories; for clarity, summary descriptions of each category are given below in note form, the information having been taken from the following references: Kendall (1893), Stamp and Beaver (1937), Smith (1949), Pounds (1959), Tylecote (1962) and Wertime (1980).

OXIDE ORES

magnetite: Fe_3O_4 : theoretical iron content 72.4%; strongly magnetic black stone, generally appearing in massive granular form; one of the most valuable sources of iron, occurring as a primary constituent of most igneous rocks (about 50% of the world's iron ore production currently comes from bodies of magnetite formed in association with igneous rocks).

Haematite: Fe_2O_3 : theoretical iron content 70%; generally gives a high yield of iron; a black to red sesquioxide of iron occurring both in a crystalline and in an amorphous powdery form. Anhydrous haematite - that is, an ore free of water in combination - also called "red haematite", constitutes the richest of all the iron ores in Britain and is found in irregular deposits in the carboniferous limestone at Whitehaven in

Cumbria and in the Furness district of Lancashire. Haematite ores containing various proportions of water in combination are termed "brown haematite" or "limonite" - see below.

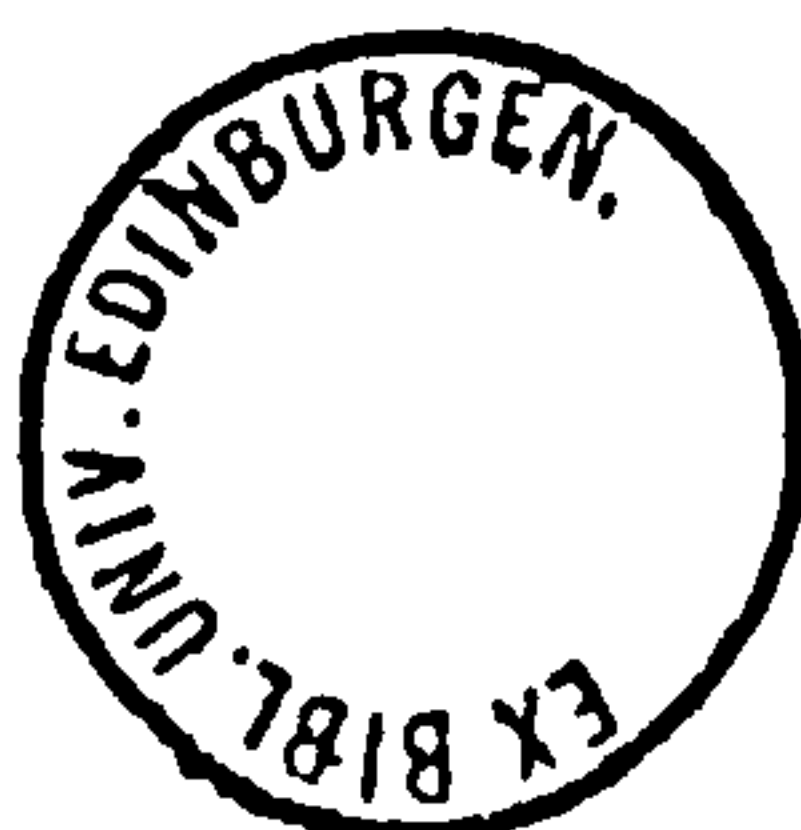
Limonite: $2\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$: theoretical iron content 59.9%. Hydrated form of haematite (limonite being the general term for hydrous ferric iron oxides). Normally brown in colour with an earthy or fibrous structure. Forms from the weathering or degeneration of other substances containing iron and occurs in beds and irregular deposits in stratified formations as the "gossan" or cap of sulphide lodes. In crystalline form it is known as goethite. In Britain, the principal deposits are found in Northants, Somerset, The Forest of Dean, Llantrisant and Weardale.

Bog iron ores: theoretical iron content - various. Sedimentary deposits of hydrated iron oxides in swamps and lakes; a loose, porous, earthy form of limonite, widespread in northern and western parts of the British Isles, and in Weardale. Analysis of bog iron ores from Gairloch, Rosshire (Macadam, 1886, 104-105) has shown that the iron content can be as high as 51.5% - "in fact, quite equal to many of the red iron ores now used for smelting and quite superior to not a few of the blackband ores even after calcination" (105).

CARBONATE ORES

This group comprises ores which contain CO_2 and water, which need to be removed by roasting prior to reduction; when FeCO_3 is roasted, CO_2 is driven off and FeO is left. Carbonate ores are easily worked but do not give such a high yield as the oxides. They occur in two forms:

- (a) nodular, also called clayband or argillaceous, occurring as beds and nodules in the coal measures of many countries, including Britain;
- (b) sedimentary, also called sideritic or spathic.



In Britain these occur along the Jurassic scarp from the Cleveland Hills into Oxfordshire in Lias formations; whilst they are carbonate ores at depth, the surface deposits have weathered in some places to limonites, magnetites and haematites.

Siderite (or chalybite): FeCO_3 : theoretical iron content 48.3%. Normally occurs in close association with impurities such as calcium and manganese which greatly reduce its value.

SULPHIDE ORES

Pyrite: FeS_2 : theoretical iron yield 46.5%. Gives a low iron yield and is difficult to work; in fact it is now mainly worked for its sulphur content, iron being viewed merely as a by-product. The sulphur must be removed by prolonged roasting in air as even a small quantity would be detrimental, imparting excessive brittleness to the finished product. It occurs in nodular form in association with a siliceous, argillaceous or calcareous matrix in coal measure deposits, and is also sometimes found in small deposits beside haematite.

Marcasite: FeS_2 : white iron pyrite, chemically identical to pyrite but formed at lower temperatures. Usually found in concretions in sedimentary rocks.

When detailing the iron resources of the British Isles, most authorities divide their material on the basis of ore types and geological formations. Thus, Tylecote (1962, 177) distinguishes three categories - carbonate ores occurring as sedimentary deposits in Northamptonshire, Lincolnshire, Oxfordshire and the Cleveland Hills, and as nodules in the Wealden Series and the Coal Measures, haematite ores occurring chiefly in West Cumberland, Furness and the Jurassic scarp from the Cleveland Hills to Oxfordshire, and limonite ores occurring mainly in the Forest of Dean and the South Wales coalfield. Smith (1949, 316)

and Pounds (1959, 38, 74) likewise divide the ores into three categories - the metasomatic replacements in the limestones of Furness, West Cumberland and the southern margins of the South Welsh coalfield, the bedded ores of the Coal Measures, and the bedded ores of the Jurassic and Cretaceous systems - and this is similar to the method adopted by Stamp and Beaver (1937, 339-348). The latter authors distinguish four principal groups: first, the haematite ores of Cumberland and Lancashire, occurring there in irregular deposits in the carboniferous limestone; second, the bedded ores, both clayband and blackband, of the Coal Measures, the former (iron carbonate mixed with earthy matter) being found in South Staffordshire, Shropshire, South Wales, Derbyshire, the West Riding of Yorkshire and the Scottish lowlands, the latter (carbonaceous ironstone) from the coal fields of North Staffordshire and Scotland; third, the bedded ores of the Jurassic rocks occurring in four main deposits, the Lower Lias of North Lincolnshire (around Frodingham and Scunthorpe), the marlstone ironbeds of the Middle Lias in the Cleveland Hills and at various locations along the scarplands from Lincolnshire to Oxfordshire, and the Inferior Oolite formations of Northamptonshire, Rutland and South Lincolnshire (the "Northamptonshire Sands"); fourth, various miscellaneous ore deposits such as those from the Carboniferous limestones of the Forest of Dean, Llanharry (Glam.) and West Durham, the Devonian rocks and granites of Devon and Cornwall, the Upper Lias of Raasay, Argyll, the Inferior Oolite of Rosedale, the Corallian rocks of East Kent and Westbury, Wilts., and the Lower Cretaceous deposits at Claxby, Lincs. and Seend, Wilts.

However, while such classificatory systems are appropriate in geological and metallurgical texts, a system which allows all the ores

from each region to be described together would appear to be more suitable for the purposes of the present study. It is in this way, then, that I shall describe the iron ore resources of the British Isles, using information derived from the following three sources: The Memoirs of the Geological Survey, the Institute of Geological Sciences' British Regional Geology volumes, and The Victoria History of the Counties of England.

SOUTH WESTERN PENINSULA

Cornwall has yielded the anhydrous oxides haematite and magnetite, the hydrated oxides goethite and limonite, and chalybite, to be found in the following localities.

magnetite:	Land's End, Tintagel, Penryn, St Austell and St Stephen's parish.
haematite:	Botallack, Lostwithiel, Knightor, Restormel, Ruby, Treverbyn and west of Launceston.
limonite:	Bodmin, St Austell and the great Perran Lode (which lies a few miles south of Newquay and extends from the coast inland for four miles).
goethite:	Restormel, Botallack and Land's End.
chalybite:	Great Perran and Pawton Lodes, Tywardreath.
South Devon:	dish-like deposits of haematite and limonite are found in the Devonian limestone around Bovey Tracey, Brixham and Newton Abbott, and a further vein occurs at Sharkham point.

North Devon and West Somerset: The lodes are primarily of siderite which has weathered near the surface to goethitic brown haematites of generally low phosphoric content; they are found in the following locations; the middle Devonian rocks of the Brendon Hills, Eisen Hill, Exmoor, the area to the north of North Molton, Barnstaple and Ilfracombe. Red haematite occurs at Minehead and Coombe Martin.

South Somerset: Ilminster-marlstone of Middle Lias contains iron carbonate (av. iron content 36%).

North Somerset, the Bristol district and Gloucestershire: In North Somerset ores are found in pockets in the carboniferous limestone, in the Wick limestone, and in bedded deposits of Triassic ore, and comprise red, brown and yellow haematites. Iron has been mined on the Mendips - a mountain limestone area made up of Old Red sandstone, carboniferous limestone, dolomitic conglomerate and red marls - from the thirteenth century A.D., chiefly in the extreme west of the region around Hulton, Harptree, Chewton and at Priddy. In the Bristol area and in Gloucestershire, red ochre is still raised from the pits around Winford to the north of the Mendips, and haematite lodes are found in Pennant Grit deposits near Iron Acton, Frampton Cotterrell and Rangeworthy. Iron deposits also occur in the carboniferous limestone and dolomitic conglomerate horizons near Yatton and Long Ashton. Carboniferous ores are present in the North Bristol - Gloucestershire coalfield, which may be a continuation of the Forest of Dean deposits; such ores are known to have been worked in the Bristol district in Ashton Vale.

WILTSHIRE, DORSET AND HAMPSHIRE

Westbury, Wiltshire: The Westbury iron ore occurs at the top of the Corallian rocks (which are abruptly succeeded by Kimmeridge (clay) consisting of marly oolitic and pisolitic limestones with bands of brown and blue sands and marls; the productive outcrop is two and a half miles in extent. Where the rocks are thin or porous the ore in its weathered outcrop form is a reddish-brown hydrated peroxide with a metallic iron content of 35.78%, but under the Kimmeridge clay it takes

the form of a dark bluish-greenish carbonate (metallic iron content 35.78%). Both ores are highly fossiliferous containing mollusc shells in abundance, some of which impart phosphorus to the ores. A similar ore occurs at Heywood, Wilts. at the same horizon.

Seend, near Devizes, Wiltshire: A mile-long deposit of brown haematite is found at Seend, occurring in ore concretions and horizontal layers in the Lower Greensand, which rests unconformably on Kimmeridge Clay. The ironstone, which has a metallic iron content of 45%, frequently forms hard dark brown crusts around patches of loosely coherent greenish quartz sand which crumbles away and leaves the rock in a cellular condition. It should be noted that the fragments of iron ore found in the excavations at All Cannings Cross

"are such as occur in the Lower Greensand of the area as at Seend. This, it is stated, was probably the ore used in the preparation of the iron, for the slags indicate the use of a fairly pure and not, particularly siliceous ore".

(Cunnington, 1923, 53)

Sturminster Newton, Dorset: Ferruginous beds occur in the Corallian rocks, similar to the oolitic ore at Westbury, twenty-two miles to the north.

Abbotsbury, Dorset: The ferruginous bed averages twenty feet in thickness and extends for a distance of several miles; the rich part, however, is confined to a synclinal area in which Abbotsbury is situated. The deposit consists of a loose, crumbly reddish-brown oolitic iron ore with a hard bed of sandstone at its base; the rocks below also contain iron ore, in the form of pellets, but this is less rich than the upper deposit, the iron content of which is not likely to be less than 30% and may even be as high at 36%. The ore is highly siliceous.

Hampshire: Iron occurs in Hampshire in the Tertiary formations, the Bracklesham, Barton, Headon and Osborne Beds, yielding a rich ironstone containing up to 50% iron, while rich septaria or nodular clay masses are found in the London Clay and Lower Bagshot Beds. Ore is known to have been extracted from the Bracklesham Beds at two locations:

- (i) The Isle of Wight; in the nineteenth century A.D. the ore, a clay ironstone, was obtained by dredging around the coast and by beach-combing.
- (ii) Hengistbury Head, near Bournemouth; the ore is found in the form of large tabular concretions which occur in regular courses and range up to twelve feet or so in diameter. They have a reddish-brown exterior (though grey within) and are made up of minute granules of iron carbonate mingled with fine angular quartz particles and streaks or specks of lignite.

THE FOREST OF DEAN AND SOUTH WALES

The haematite deposits of the Forest of Dean and South Wales are of essentially the same character and occur under similar conditions, that is in masses of irregular shape formed by metasomatism - chemical replacement of constituent minerals in rocks by iron compounds - taking place after the consolidation of the enclosing rock. In the Forest, the ore is found principally in the carboniferous limestone but also, in small measure, in the Drybrook sandstone and the Coal Measures; in Wales it is found purely in the carboniferous limestone.

The Forest of Dean: An oval basin of carboniferous rocks between the River Severn below Gloucester and the River Wye below Ross.

The centre of the basin consists of Coal Measures surrounded by belts of carboniferous limestone and Drybrook sandstone (also referred to in the literature as Millstone Grit), which are in turn surrounded by Old Red Sandstone. The carboniferous limestone and Drybrook sandstone outcrop in bands of varying width along the rim of the basin. Thus the geological succession is as follows:

Coal Measures
Drybrook sandstone
Carboniferous limestone
Devonians or Old Red sandstone

The Millstone grit contains a deposit of iron ore in its lowest bed, while the Coal measures likewise contain a small amount of ore; the most extensive deposits, however, are to be found in large pockets in the Upper Beds of the carboniferous limestone.

The main ores are brown haematites, including the crystalline form goethite, containing up to 58% metallic iron and almost completely free of impurities such as phosphorus and sulphur. Red ochre, too, was mined in the historic past; small deposits of this mineral occur throughout the limestone, but workable deposits are to be found only in two places - St Annal's Pit on the East side of the Forest and High Meadow Mine on the West.

South Wales: Deposits of haematitic ore, both red and brown, occur throughout the upper beds of the Carboniferous limestone (at the top of the Main Limestone, within the Main Limestone and in the Lower Limestone shales) which forms the southern border of the South Wales coalfield; the most important ore bodies, however, are restricted to a small area eight miles in extent on the south-east margin of the coal basin between Llanharry and the east side of the Taff Valley. Moreover, carboniferous ores, both clayband and blackband, occur throughout

the Coal Measures of the South Wales coalfield - in Monmouthshire, Glamorgan, Cardiganshire, Brecknock and Pembrokeshire.

NORTH WALES, THE WELSH BORDERLAND AND THE WEST MIDLANDS

North Wales: Small masses of haematite ore associated with the carboniferous limestone and, more rarely, with carboniferous basement beds in Flintshire (the Dyserth, Cwm, Henfryn and Caerwys areas - and note especially an outcrop at Moel Hiraddug), in Denbighshire (The Vale of Clwyd) and on Angelsey. Carboniferous ores are found in the Coal Measures of Caernarvonshire, Angelsey, Brecon, Flintshire and Denbighshire. (Tylecote mentions further ore deposits - the types are not specified - in Montgomery, Merioneth and Cardigan.)

Worcestershire: Coal Measure ores.

Warwickshire: Coal Measure ores.

Shropshire: Coal Measure ores.

Staffordshire: Coal Measure ores; blackband ironstones in the north of the county, claybands in the south.

Cheshire: Ore deposits on Alderley Edge (in association with copper).

THE WEALD AND KENT

The Weald: An elevated chalk dome defined by two chalk escarpments, the North and South Downs, stretching in an arc from Dover into Hampshire and thence along the South Coast to Beachy Head. Within this rim is a narrow valley of Gault Clay, succeeded by a second series of escarpments, the Lower Greensand Ridge. Within this ring of Greensand Hills lie the Wealden rocks, a belt of low-lying clay

beginning West of Romsey, widening in West Sussex and curving south towards Pevensey, Sussex. In the centre is the high ground of the Hastings Beds extending from Hastings to Horsham. The most important iron-bearing strata are the Hastings Beds (partly composed of Wadhurst Clay), the Weald Clay and the Lower Greensand. The ore most commonly used in historic times was clay ironstone (or "Sideritic mudstone") which occurred as thin beds or as tabular or nodular masses in the lower deposits of the Wadhurst Clay and Ashdown Sand throughout the Central Weald (but dwindling in West Sussex). Outcrops of clay ironstone weather to limonite within two metres or so of the ground, disintegrating into small fragments which then become cemented into large lumps; the clay ironstone of the Weald thus comprises siderite with a covering of limonite, the iron content of the ore averaging 40%. (A sample from Ashburnham yielded 35%, similar to the average iron content of the clay ironstone of the Coal Measures.)

Other deposits include the brown siliceous ironstone or carstone occurring in irregular bands in the Folkestone Beds of the Lower Greensand, especially abundant in Surrey and West Sussex (and also occurring in the sands along the top of the chalk escarpment in East Kent), the bright red ferruginous grit found at the base of the Gault Clay, the ironstone nodules of the Hastings Sands, the limonitic sand of the Sandgate Beds near Midhurst and a form of bog iron comprising clay, gravel and 25-30% iron oxide, forming on the gravels of the Weald Clay as a result of poor drainage. Oolitic ores have been discovered at several horizons in the East Kent coalfield, the two principal locations being in the upper part of the Corallian series, best developed around Dover (33% metallic iron), and in the Lower Kellaways rock around Fredville (21.10% iron), the iron in both cases occurring in oolitic form

with the limonite fragments being set in a marly matrix; other ferruginous bands were present in the Lower Corallian and Liassic strata of this area. Also in East Kent there is a ferruginous bed at or near the base of the Oldhaven Beds near Canterbury, which may have been worked in the historic past. As for North Kent, Champion has drawn attention to the ironstone nodules present in the Thanet Sands, London Clay, Norwich Beds and Oldhaven Beds, and to the occurrence of limonitic ores in the river gravels (Champion, 1976).

SOUTH-EASTERN ENGLAND NORTH OF THE WEALD

The counties of *Bedfordshire, Cambridgeshire, Suffolk, Buckinghamshire, Hertfordshire, Essex, Berkshire, Middlesex* and *North Surrey* would appear to lack iron ore resources, though small deposits in this region, as elsewhere, may have been worked out, gone unnoticed or been deliberately disregarded owing to ore deficiency, both in terms of quantity and quality; indeed, as Tylecote pointed out,

"Since the Tertiary strata in the Hampshire area have yielded deposits worked in the pre-Roman Iron Age and in the nineteenth century, it is very probable that there are deposits in similar strata elsewhere, i.e. in Essex and the Home Counties."

(Tylecote, 1962, 179)

The deposits of ore around Weybridge, Surrey, notwithstanding their relationship to the Early Iron Age site at Brooklands, to be considered later, thus merit particular attention on distributional grounds. An ironstone pan of between eight and twenty centimetres thick and containing 33.5% iron (and not the 23% figure quoted by some authorities) occurs in eroded hollows at the base of the Eocene Bracklesham Beds

at their junction with the Bagshot formations, and was extensively worked in the late eighteenth and early nineteenth centuries A.D. around St George's Hill, Weybridge, while a similar pan from the same horizon has been recorded from Woburn Hill, Surrey. It is likely that such pans were formed by the weathering of iron carbonate (sideritic mudstone), such as has recently been found in an exposure of the Lower Bracklesham Beds at Redhill.

EAST CENTRAL ENGLAND

Oxfordshire, Northamptonshire, Leicestershire, Rutland, Huntingdonshire and Norfolk: The first deposit to be considered is that of the calcareous brown haematites and deeper calcareous carbonates in the marlstones of the Middle Lias in North Oxfordshire, Warwickshire and South West Northamptonshire stretching from the head of the Nene Valley near Daventry to the Evenlode Valley near Charlbury, and being particularly well-developed in the region of Banbury; in general, these are highly phosphoric ores with an average iron content of 27.3%. A second deposit from the marlstone beds of the Middle Lias occurs on the Melton Mowbray ironstone ridge around Holwell and Eaton in Leicestershire, separated from that described above by an area in which the marlstone beds do not have the character of a workable ironstone. (In South Lincolnshire and Leicestershire the Middle Lias is found in a clear horizon about 3.7 metres thick at the top of the marlstone and is thus exposed on the dip slope of the escarpment.) The ores in this location are lean (average 25% iron content) and as with the Banbury field, outcrop as brown haematites while occurring as carbonates at depth. The third deposit, the bedded deposits of inferior Oolite of the Northamptonshire Sand Ironstone, is much more extensive,

extending from Lincoln in the north, through Rutland and East Leicestershire, to Towcester, Northants. in the south, a distance of eighty miles. The ores - siderite, chamosite and limonite/goethite - occur in a relatively flat bed close to the surface, underlain by Upper Lias clay, and constitute the richest of the Jurassic ores, yielding between 28 and 33% iron, 16 to 18% silica, 2-10% lime and 0.7% phosphorus. One outcrop of especial archaeological interest is that at Hunsbury Hill, Northants, worked in prehistory and in the nineteenth century A.D. In the area to the east of this region ores are sparse; Tylecote includes in his catalogue a possible occurrence of ore (of unspecified type) in North-West Huntingdonshire, and further deposits in the Lower Greensand of West Norfolk and the Holt-Cromer ridge.

Lincolnshire, Nottinghamshire and Derbyshire: The most important of the Lincolnshire deposits is the Frodingham ironstone of the Lower Lias in the north west of the county between the River Trent and the River Ancholme, extending from the Humber in the north to Ashby Ville in the south. The ore from this area is exceedingly lean (iron content 20-22%) consisting of limonite oolites in a matrix of chamosite and siderite, mixed with shells, up to 20% lime and an appreciable quantity of manganese. Other smaller deposits include the ironstone of Cretaceous age at Claxby and the deposit of oolitic ore in the marlstone of the Middle Lias at Caythorpe in the south of the country. In Derbyshire the carboniferous limestone contains small deposits of haematitic ores occurring in fissures in the limestone and associated with deposits of lead. More important though are the carboniferous ores found as rows of nodules or balls in the coalfields of both Derbyshire and Nottinghamshire, such fields comprising parts of the Lancashire and Cheshire Coal Basin, the Leicestershire field and the Nottinghamshire-Yorkshire Coal Basin.

YORKSHIRE

Another area in which the marlstone beds of the Middle Lias contain iron ores is that of the hilly Jurassic country of the North Riding of Yorkshire north of the Vale of Pickering, where the marlstone beds outcrop on the north flanks of the Cleveland Hills; the principal outcrop of these ores, which contain c. 28% iron, coincides with an escarpment running south east from the coast near Saltburn to Roseberry Topping and thence south through Kildale. The other principal ores from this county are those in the Coal Measures of the Yorkshire Coalfield (which extends south into Nottinghamshire and Derbyshire), while deposits of magnetite ore found in Rosedale.

NORTHERN ENGLAND

North-Eastern England: In Northumberland, as in Durham, the Coal Measures yield beds of carbonate nodules interspersed with the coal seams, while similar nodules are to be found in the shale beds of the carboniferous limestone of Central Northumberland. The veins and flats of the upper part of the Carboniferous series in Weardale produce iron carbonate and limonite; while bog iron is found in layers 8-10 centimetres thick at a depth of about 20 centimetres under the turf, and some siderite is found in association with lead veins. Carbonate nodules are also found in the shale beds of the carboniferous limestone of Upper Teesdale.

North-Western England: There are several small deposits of iron ore in this region which can be summarised as follows:

- (i) siderite and limonite at Alston, East Cumberland;
- (ii) coal measure ores in the Lancashire and Cumberland coalfield;
- (iii) haematites in the granites of Eskdale;
- (iv) bog iron ores in the hills of Cumberland.

The most important deposits, however, are the haematites of the carboniferous limestone series of West Cumberland. The ore occurs (either following lines of faulting or else at the contact between the limestone and the underlying Silurian rocks) in irregular deposits in the belt of carboniferous limestone which wraps around the west and south sides of the Lake District dome, stretching from Whitehaven in the north to Ulverston in the south, and as an anhydrous haematite with an exceedingly high iron content of between 50 and 60%, and almost free of such impurities as phosphorus and sulphur. It occurs in two concentrations; in the north in the area around Kelton, Salter, Winder, Frizington, Cleator Moor, Bigrigg and Egremont in West Cumberland, and in the south extending from the Duddon Estuary into Furness, the ore being found in a series of dish-like deposits.

The Isle of Man: Spathic and red haematite ores, practically identical to those from Cumberland, are found in the north-east of the island around Manghold Head, probably formed by the alteration of calcite and dolomite veins by ferruginous waters from Triassic deposits.

SCOTLAND

The description of the ore deposits of this area can best be prefaced by the words of Macadam (1886, 90):

"We have the materials for the manufacture of iron at nearly every man's door",

and indeed, not only are the ores widespread but also various; the following five categories are to be found -

bog iron ores
haematites
carboniferous clayband ores
carboniferous blackband ores
Jurassic ores

Central and Southern Scotland: Both clayband and blackband ores occur in the coal-bearing strata of the Lower Carboniferous rocks and the Coal Measures - in Ayrshire, the Central Coalfield, Midlothian and Fife. Haematite ores are found throughout Kirkcudbrightshire, Lanarkshire, Dumfriesshire, Galloway and Wigtownshire, and at the following specific localities:

Noblehouse, Peebles
Riccarton, Midlothian
Auchinlongford, Ayrshire
Carleton, East Lothian
Loch Doon
Wanlockhead, Lanarkshire
Abernethy, Perthshire

Limonite occurs at Auchinlongford and in the Leadhills district, siderite at the latter location and chalybite at Whithorn, Wigtownshire, while bog iron ores are widespread.

Highland Scotland: Haematite ores occur in the following localities:

Lecht, Tomintoul, Banff
Ardmilly, Craigellachie, Banff
Well of Spa, Aberdeenshire
Garron Point, Stonehaven, Kincardineshire
Fearn, Edderton, Rosshire
Letterewe, Loch Maree, Rosshire (?)
Tornapress, Kishorn, Rosshire

Sanachan, Kishorn, Rosshire
Achavarasdale, Reay, Caithness
Dornoch, Sutherland
Stralachan, Argyll
Glengarry, Inverness, Argyll
Isle of Hoy, Orkney

Two deposits merit special attention, first the Raasay ironstone, a Mesozoic bedded ore in Jurassic strata, occurring in the lower portion of the Upper Lias on the east of the island and containing 23-26% iron and c. 22% lime, and second the siderite, haematite and iron pyrites from a series of faults in a strip of Old Red Sandstone which run down the east coast of Mainland, Shetland. Similar ores are also found on the Isle of Fetlar, Shetland, and here, as elsewhere, bog iron ores are widespread; the analysis of one such ore is given below. (Appendix 3 pr 4)

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SECTION II

CATALOGUE

The Earliest Occurrences of Iron in Great Britain
Typology, Distribution and Sequence

Introduction

It is my intention in this section to arrange the earliest occurrences of iron in Great Britain in chronological order, describe their distribution and consider, where possible, their typology, such a discussion being based upon the primary catalogue, the accurate compilation of which has been my principal concern. Previous discussions of the adoption of iron in Great Britain have been based upon partial and sometimes spurious evidence, unreliable associations accorded undeserved authenticity, radiocarbon dates handled unscientifically in an attempt to compensate for their scarcity and extant artefacts described on the basis of published references rather than first-hand examination. If I seem to be being unduly captious let me cite one example by way of illustration, that of the bronze axe in the Sompting hoard, Sussex, which evinces a slight iron stain on its upper surface; it is not my purpose here to cast doubt on the antiquity of the iron trace - for that see page 206 - but simply to illustrate the way in which spurious authenticity can be conferred on a find through the repeated publication of inaccuracies.

"A second hoard to show an association between Late Bronze Age types and iron comes from Sompting, Sussex, where the remains of a class B2 cauldron were recovered together with seventeen axes and a Hallstatt phalera ... To one of the axes adhered a mass of corroded iron."

(Cunliffe, 1978a, 146)

"Apart from amorphous lumps of iron in such hoards as Sompting, Sussex ..."

(Gingell, 1979, 248)

"It is surely significant that iron objects were included in two of the handful of hoards that can be assigned to the Llynfawr period, Llynfawr itself and the Sompting hoard."

(Burgess, 1979, 273)

Before embarking on a discussion of typology, sequence and distribution some explanation of my method of ordering the material in a chronological sequence must first be given. Scanty use has been made of radiocarbon dates, for not only do few exist for this period - though the British Museum's current project is helping to alleviate this scarcity - but fewer still are directly attributable to contexts containing iron; it is, moreover, notoriously difficult to calibrate dates within this time-span as inspection of Suess's and Switsur's curves will reveal (in Clark, 1975, fig. 2). The building up of a relative sequence by means of associated bronze artefacts is equally difficult owing to the paucity of secure associations of the two metals and to our current lack both of precision in dating, and understanding of, the Ewart Park industrial tradition, while the typological conservatism of the iron artefacts themselves and, in many cases, their condition, precludes comparison with continental parallels from contexts where dating evidence is available.

It has therefore been necessary to use pottery as the chief chronological tool for ordering the metalwork, pottery being both plentiful and susceptible to detailed typological analysis, and thus each of the sections which follow will be prefaced by a summary of the ceramic sequence applicable to the region under consideration. In the case of Southern England, I have relied heavily upon the work of John Barrett whose recent research (1975, 1976a, 1978, 1979a, 1980a) has revolutionised our understanding of the pottery of the first half of the First Millennium B.C.; using the evidence of radiocarbon dates, metalwork associations and stratigraphic sequences at such sites as Rams Hill, Berkshire and South Cadbury, Somerset, he has convincingly filled up the ceramic void alluded to in Chapter I. I shall not summarise

his sequence here, for to do so would be to detract from its merit, part of which lies in the fact that it is not a simple, unilineal scheme which can be applied uniformly over Lowland England, but rather one which conceives of regional industrial traditions evolving at different speeds and reacting variously to external stimuli, a concept adopted by bronze specialists in the mid 70's following the publication of Rowlands' thesis on Southern British Middle Bronze Age metalwork (Rowlands, 1976); such varying regional industrial traditions will thus be described individually in the relevant sections. In the case of the pottery from the remaining areas - Wales, Scotland and the Highland regions of England - which has not received such intensive study in recent years, I have had to use local reviews, variously attributed in the text.

WILTSHIRE AND CRANBORNE CHASE

The intensity of research into the later prehistory of Wiltshire - the antiquarian studies of Aubrey, Cunnington, Colt Hoare, Britton and the Rev. A.C. Smith, the excavations by General Pitt-Rivers between 1880 and 1890 on his estates on Cranborne Chase and those of M. and B.H. Cunnington between 1907 and 1932, the aerial photography of O.G.S. Crawford and A. Keiller, the catalogues of the Rev. E.H. Goddard and L.V. Grinsell, and the activities of the County Society and the Museum - is well known and needs no further documentation here; an assessment of the value of the evidence gleaned from such research does, however, merit consideration - indeed, is an essential preliminary to this, as to every, section.

Much of the evidence discussed in this section derives from the excavations of Maud Cunnington and her husband, Benjamin, in the early decades of this century, from the contemporary excavations of

Nan Kivell and R.C.C. Clay and from the fieldwork of O. Meyrick; while the standard of many of these campaigns was excellent for their time, the results must be treated with caution. With regard to the excavation techniques themselves, the primary drawbacks are the extent of the investigations (generally limited to narrow trenches across boundary features and concentration on gullies, pits and post-holes in the interior) and the lack of stratigraphic recording other than in the ditches; the latter point is best illustrated by comparing Mrs. Cunnington's detailed recording of the ditch stratigraphy at such sites as Oliver's Camp and Figsbury Rings with her treatment of the interior at the apparently unenclosed site of All Cannings Cross (Cunnington, 1907-8; 1925-7; 1923, respectively).

Prompt publication invariably followed, but as we shall see, many of these reports are so partial as to limit severely the amount of information which can be extracted, rendering them little more than catalogues of finds. Furthermore, at least in the case of the Cunnington's excavations, the site records and contemporary notebooks which could amplify such partial reports were not deposited in Devizes Museum along with the finds. Even the latter present problems; first-hand examination of the collections in various museums has shown that much of the less spectacular material from these sites, such as unworked bone, undecorated pottery, daub, stone implements and, alas, slag, if indeed initially recognised in the course of excavation, was discarded by directors and curators, who doubtless deemed them unworthy of preservation. Examination of the finds from these sites is further hampered by the practice, current at the time of the Cunnington's excavations, if not later, of distributing the more impressive artefacts not only to museums but also to friends of the excavators, the classic

case of this being the material from All Cannings Cross which can be found in National, County and University Museums throughout Britain, and doubtless also in private collections. Moreover, after locating the material, further problems occur, as lack of recording either on the boxes in which the artefacts are stored or on the artefacts themselves renders much of the evidence useless.

The chronological framework

Despite the fact that the later prehistoric pottery of Wiltshire has received intensive attention due partly, no doubt, to the distinctive fabric, forms and decoration of vessels from such sites as All Cannings Cross and Cold Kitchen Hill, its study, *pace* Barrett (1980a, 310) is still fraught with difficulties; with the Deverel-Rimbury complex having been pushed back into the latter half of the second millennium and furrowed bowls dated later than 650 B.C. on grounds of their seeming similarity to a cast bronze bowl in the Welby hoard, the void loomed large.

From the evidence currently available it would appear that Deverel-Rimbury ceramics in this area had a longer currency than in the Thames Valley, South Eastern and South Western England, and that the sequence which has been shown to occur in those areas - whereby barrel, bucket and globular urns were succeeded at the end of the second millennium b.c. by a tradition of plain ware assemblages comprising a restricted range of plain, coarse straight or convex-sided jar forms with slab-built walls and finger-smeared surfaces, plain upright or hooked rims and splayed or simple bases - does not obtain here. As part of the project of re-examining the material from Pitt-Rivers' excavations on Cranborne Chase (Bradley and Barrett, 1978; Barrett *et al.*, 1978, 135) charcoal samples from various contexts within the Middle Bronze

Age cremation cemetery at Handley Barrow 24, Sixpenny Handley, Dorset (Pitt-Rivers, 1898, 147-171; pl. 295), collected by the General in 1893, were recently submitted for radiocarbon dating, with the following results:

BM 1644	with sherds of bucket urn	760 \pm 40 b.c.
BM 1645	inside bottom half of bucket urn	890 \pm 35 b.c.
BM 1646	from globular urn (Pitt-Rivers, pl. 301.2 associated with decorated sherd, pl. 301, 3)	950 \pm 40 b.c.
BM 1647	fill of lower half of bucket urn	870 \pm 40 b.c.
BM 1648	barrel/bucket urn	860 \pm 60 b.c.
BM 1649	bucket urn	720 \pm 45 b.c.

(Burleigh *et al.*, 1981, 20-21)

As can be seen, each sample was securely associated with Deverel-Rimbury pottery, suggesting the continuation of that tradition into the 9th and 8th centuries b.c. in Cranborne Chase. The only other relevant radiocarbon dates at present available are those from the unenclosed settlement at Bishop's Cannings Down, South Avebury (Gingell, 1980; Burleigh *et al.*, 1981, 22-3), three of which, BM 1713, 1716 and 1717, lie in the eighth-ninth centuries b.c.; reputed to be "closely associated with Bronze Age pottery", these dates are thought to "emphasise the survival of Bucket, Biconical and Globular Urns to the end of the Middle Bronze Age and perhaps later" (Gingell in Burleigh *et al.*, 1981, 23).

In the absence of further radiocarbon dates - those from the recent campaign of re-excavation at the South Lodge enclosure, Rushmore Park, are eagerly awaited - it is necessary to turn to metal-work associations for confirmation of such a sequence. One which has been repeatedly used to point to the longevity of the Deverel-Rimbury tradition in this region is that of a so-called "transitional"

palstave (Burgess' Gp. IV, 1974; fig. 31) with "British" (i.e. Deverel-Rimbury) pottery in the basal silts of the Angle Ditch (Pitt-Rivers, 1898; pl. 263, 1; pl. 264, 14; pl. 265, 15; pps 106-7), a type generally considered to belong to the Penard industrial tradition. It is worth noting that O'Connor's recent reidentification of this tool as a Norman palstave (O'Connor, 1980, 47-49, 95) raises the possibility of a slightly earlier date for this tool type within the Taunton tradition - but too much importance should not be placed on this argument in view of the tool's fragmentary condition, rendering precise identification impossible. Two further oft-quoted associations are those of the tanged bifid razors with Deverel-Rimbury material at South Lodge and Angle Ditch. That from South Lodge, found in the secondary silting of the enclosure ditch, had rounded shoulders, a distal notch and a central thickening defined by shallow grooving (not plain, as shown in Mrs. Piggott's catalogue, 1946, fig. 7), while the fragmentary razor from the basal silts of the Angle Ditch (Pitt-Rivers, 1898, 107, fig. 263, no. 2) was holed and probably also notched. Notched tanged bifid razors have a long currency and widespread distribution in the British Isles and despite the various attempts at arranging them into a typological sequence (Piggott, 1946 C.M.; Piggott, 1973b; O'Connor, 1980), precision in dating is still not possible. Burgess would place the South Lodge example within the Penard industrial tradition on the basis of Rosn  en parallels (Burgess, 1968, fig. 4, 8; Piggott allies it to the Glentool razors and thus dates it to the Taunton tradition, 1973b) while that from Angle Ditch should probably also be so dated (Burgess, 1968, 34, n.5); it should, however, be noted that unribbed notched holed razors also occur in Wilburton (e.g. the Ugley hoard, Essex) and Ewart Park contexts

(Ivinghoe Beacon, Bucks.; Heathery Burn, Co. Durham; Runnymede, Egham, Surrey).

An association which has not received much attention is that from Launceston Down; a barrow (Barrow 2) dug there in 1864 is reputed to have contained a cremation, a "broken (barrel) urn", a fragmentary side-looped spearhead (Piggott and Piggott, 1944, 49-50) and socketed gouge fragments (Rowlands, 1976, app. 2.233.no.37 : B.M. 92, 9-1, 297-8) the latter first occurring in South Eastern England in hoards of the Wilburton industrial tradition. However, too much importance should not be given to this find in view of the manner and date of its excavation; the excavator, Warne, reports that "the five tumuli on the Down were dug by me, assisted by Mr. Shipp, on the longest day of 1864" (Warne, 1866, 23) while neither his report nor that of the Piggott's mentions the gouge fragments.

That from the recent excavations at Burderop Down, an unenclosed settlement on the northern escarpment of the Marlborough Downs is, however, more reliable (Gingell, 1980); though the evidence of the Bulford-Helsbury axe mould must be discounted on account of its being a surface find, other metalwork relating to the Ewart Park industrial tradition, described in the report as "Heathery Burn type pins and finger-rings made from terminals of strip bracelets", was securely associated with Deverel-Rimbury pottery (Gingell, 1980, 218) leading the excavator to suggest the continuation of Deverel-Rimbury forms into the eighth century B.C. Further discussion of this important material must, however, await the full publication of the site, as little can be surmised from the interim report currently available, lacking as it does illustrations of the vital metalwork and the relevant stratigraphy.

Not only does the pattern in Wiltshire differ from that in the Thames Valley and the South East in that Deverel-Rimbury types appear to continue into the tenth century B.C., if not beyond, but also with regard to the paucity of plain ware. Barrett and Bradley have drawn attention to an unpublished scatter on Cranborne Chase (Barrett and Bradley, 1980b, 199) and to a sherd from among a surface collection from a small rectangular enclosure on Stanton St. Bernard Down (Meyrick, 1945-7, 258-9, figs II and III) which they interpret as belonging to a "Form I" jar (plain, thin-walled jars with straight or convex sides and simple rims) and I suggest that certain sherds illustrated by Mrs. Piggott in her report on similar enclosures on Ogbourne Down (1942, fig. 7, 14, 20, 21, 23) may likewise belong to such vessels; (compare, for example, the plain squared rim, no. 20, with nos 4 and 11 from the 1.8 assemblage at Rams Hill, Berks, Barrett, 1975, fig. 3.5). Only two further sites yield such material - Angle Ditch and Burderop Down - and in both cases the plain ware is associated with Deverel-Rimbury sherds. At the former site a sherd from a plain thin-walled vessel (Pitt-Rivers, 1898, pl. 264, 9, 113) was found in the secondary silting stratified both with and above Deverel-Rimbury material, while at the latter site sherds of finger-streaked plain ware jars are stratified with Deverel-Rimbury material.

Allied to the acceptance of the extended chronology outlined above is a shift in emphasis from understating to stressing the "Deverel-Rimbury contribution" in the early part of the first millennium B.C. in Wiltshire, so much so that even the idea of Deverel-Rimbury influence on coarse pottery from such sites as All Cannings Cross and Cold Kitchen Hill, a view first promulgated by Mrs. Cunnington in 1923 (21-22) but rejected following the back-dating of the Deverel-

Rimbury complex, has recently been revitalised. Barrett, for instance, does not conceive of a break in the use of finger-tipping on coarse wares as occurs in other areas of Southern England, and furthermore derives a series of coarse ware jars from Cold Kitchen Hill and a similar vessel from All Cannings Cross (Cunnington, 1923, 185, pl. 48a.1; notably in heavily flint-gritted ware) from Deverel-Rimbury prototypes, allying them in particular to vessels from Thorny Down, (Stone, 1941, fig. 5, 1-3), while Gingell has pointed to survivals both in fabric and in form (Gingell, 1980, 220).

The task now confronting those studying the pottery of the first half of the first millennium B.C. in Wiltshire is that of attempting to demonstrate a continuous sequence from Deverel-Rimbury/plain ware assemblages to the decorative wares - coarse jars with finger impressed decoration, fine jars with stamped and incised decoration and surface polishing, coarse bowls with limited surface treatment and fine bowls with stamped, incised and furrowed decoration and refined surface treatment - found at such sites as All Cannings Cross, Cold Kitchen Hill, Potterne and Liddington, Barrett having postulated that there was a hiatus in both pottery and settlement between the tenth century B.C. (the date at which he would set the demise of the Deverel-Rimbury complex), and the eighth century B.C. (the date at which he would place the appearance of the decorative assemblages). Since most of the ironwork listed in the following section is associated with decorated pottery, the date of the latter's appearance is clearly of vital importance and must be considered in detail.

Barrett derives his date for the appearance of decorated assemblages in Wiltshire from two sources - the dating of similar assemblages in the Thames Valley and that of furrowed bowls. With regard to the

first he cites similarities between the decorated pottery from such sites as All Cannings Cross, Cold Kitchen Hill, Potterne, Liddington and Martinsell and that from sites in Berkshire - Lowbury Hill, Waylands Smithy, Knight's Farm and Rams Hill; indeed, so similar is the pottery from these areas both in form and decoration - similarities include the application of a haematite slip and the use of such motifs as double concentric circles, incised lines edged with stabbing and herringbone patterns - and so clear cut is the distribution, that he conceives of a North-Wessex/Berkshire style zone. One group of decorated pottery from Knight's Farm, Berks (where such assemblages occur, as at Rams Hill, in immediately post-plain ware contexts) comprising vessels with finger-tip impressions and finely incised bowls (Bradley *et al.*, 1980, figs 34 and 35) was directly associated with two radiocarbon dates (Har 1011, 740 ± 80 b.c. and Har 1012, 600 ± 80 b.c.) interpreted by Barrett as denoting an eighth century B.C. date and considered to be applicable also to the Wiltshire material.

Among the vessel types which comprise the decorated assemblage are "furrowed bowls", omphalos-based carinated open bowls with short necks and everted rims or long necks and simple rims, invariably coated with a haematite slip (either red or black), and these form Barrett's second dating source. Wood charcoal from a post-hole of a round house from Enclosure II at Longbridge Deverill Cow Down, Warminster, yielded a date of 630 ± 155 b.c. (N.P.L. 105) and while the pottery which was directly associated with the sample was described in Radiocarbon as "having affinities to Bronze Age types", the house reputedly also contained haematite furrowed bowls, to which this date is therefore thought to apply; this, too, is interpreted by

Barrett as indicating that the date of the appearance of the decorative assemblages cannot be "pushed back much further than the eighth century B.C." (Barrett, 1980a, 310). However, other, far earlier, dates have been proposed and these alternative chronologies must also be considered and evaluated before the dating framework used in the present study is outlined.

The first of the two proponents of an earlier currency for furrowed bowls whose work I shall consider is Champion, who set out his ideas in the article "Britain and the European Iron Age" (Champion, 1975) and later in his thesis of 1976. In short, he argues that furrowed bowls can be compared to a cast bronze cup in the so-called hoard from Welby, Leics. (Powell, 1948) and that the tenth century B.C. date for two of the items therein - the cross-handles from a bronze bowl similar to those from the Ha.B1 hoard from Unterglauheim - can be applied to the furrowed bowls; it is an argument worth studying in some detail.

While many authors have queried the comparison between the metal and the ceramic examples on such grounds as the discrepancy in their distributions, the disparity in their status, and size¹ (and hence function), and the integrity of the Welby find itself², none of these problems is insurmountable; with regard to the first, for instance, it should be borne in mind that our understanding of the

¹ By way of a footnote, it is interesting to note that the capacity of the Welby vessel is merely 120 c.c. As pottery cups are notoriously few in plain ware assemblages it is likely that this function was carried out by means of wooden vessels, which may conceivably have been furnished with grooves beneath the lip to facilitate handling.

² Irregularly discovered and only partially preserved (Powell, 1948, 27, 40).

circulation and distribution of Bronze Age metalwork is still minimal (a fact made starkly apparent by the recent wreck finds off the South Coast) and that while arguments *ex silentio* are dangerous, it is conceivable that further examples of these undoubtedly precious artefacts have simply not survived from the area of distribution of furrowed bowls, an area markedly lacking in Later Bronze Age hoards.

Rather it is Champion's methodology that I would question, namely his application of the date of the earliest items in the hoard to the unique cast bronze vessel and, by extension, to the furrowed bowls. The cross-handle attachments may indeed date to Ha.B1; Powell compared them in the hoard's original publication to attachments on a vessel from the Unterglauheim hoard (Powell, 1948, fig. 4), later dated by Müller-Karpe (1959, 167) to Ha.B1, and though O'Connor following work by Patay has questioned the definite attribution of such handles to von Merhart's Type B1 - for it must be remembered that we lack the vessel itself and thus the vital means of distinguishing between von Merhart's Types B1 and B2a (von Merhart, 1952, 3-15) - he, too, would place them "in the earlier part of HaB" (O'Connor, 1980, 388). However, not all the items in this hoard can be dated as early as the tenth century; while it is conceivable that the pegged spearhead (Inv. Arch. 24, 1) might date to the Wilburton tradition - such spearheads occur throughout the later Bronze Age from the Penard industrial tradition onwards (Ehrenberg, 1977, 13-15) - the remaining items are paralleled in hoards of the Ewart Park industrial tradition, conventionally dated to the 9th - 8th centuries (Burgess, 1979). The sword (which Megaw omits to mention when arguing that the hoard should be placed in the Wilburton industrial tradition: 1979, 310) is of classic Ewart Park type (Cowen, 1933) while the socketed axes with moulded

collar, sub-collar ribbing and waisted and splayed edged blades decorated with vertical ribs are typical of East Midlands early Ewart Park hoards (Newark, Notts., Inv. Arch. 36, 6, 7; Great Freeman Street, Notts., Inv. Arch. 22, 1-4; Bagmoor, Lincs., Inv. Arch. 23, 11-13). Similarly, the hollow-toothed mount fragment (Inv. Arch. 24, 7) hollow cast ring (*ibid.*, 8) and five strap distributors (*ibid.* 11-15) are paralleled by types in the Parc y Meirch, Denb. (Savory, 1980a, fig. 39) and Heathery Burn, Co. Durham (Inv. Arch. 55) hoards, while the disc with circular perforation (Inv. Arch. 24, 16) is related to double-looped buttons in the Watford (Carp's Tongue) hoard (Coombs, 1979, fig. 11.6); phalerae, strap-crossings and annular-looped rings do indeed occur in the Wilburton industrial tradition (Isleham, Cambs., Wilburton, Cambs.) but better parallels for the Welby examples are to be found in the subsequent tradition, as listed above. In short, it is methodologically incorrect to pin the date of the cast bronze cup on to those items in the hoard which date to the tenth century, disregarding these later artefacts.

Champion's suggestion that furrowed bowls might date as early as the tenth century was followed, and expanded upon, by Avery in his thesis of 1979 (later published as Avery, 1981), who concluded that

"Hawkes A furrowed bowls should follow on directly from Deverel-Rimbury after little, if any, gap at a date in the eleventh century."

(Avery, 1981, 46).

At the time of writing, this startling hypothesis has neither been assimilated into current thinking, nor challenged; here I shall attempt the latter task.

Avery's treatment of the available radiocarbon dates, one of the two props upon which his revised chronology rests, can only be

described as cavalier; desirous of obtaining a date in the eleventh century B.C. for the advent of furrowed bowls in Britain, he interprets the evidence eclectically to achieve the desired result. Consider, for example, his use of the dates from Longbridge Deverill, one of which, N.P.L. 105, was referred to earlier in connection with Barrett's contention that decorated assemblages appeared in the eighth century B.C. Selecting only three of the ten dates from the site, those associated with the post-holes of Houses 1 and 2, Enclosure II (the location of N.P.L. 104 is not specified) which reputedly contain furrowed bowls, he calibrates these at the 95% probability level according to Clark's curve (Clark, 1975), concluding that "there could have been a house at the site any time between the 12th and the 4th centuries B.C." (Avery, 1981, 38), a range which would have been extended into the final centuries of the 1st millennium B.C. had he included the other date for House 2, N.P.L. 107, or that from House 3, H.A.R. 380 ± 60 b.c.: The site is complex, its succession of enclosures and round houses affording a rare opportunity to construct a typological sequence for furrowed bowls (Harding, 1974, 149) - but until the final publication appears and the vital stratigraphic evidence has been set before us in plan and section, we must not attempt to mould the evidence to suit our theories, as Avery is doing in the following, archaeologically meaningless, statement:

"A date in the eleventh century B.C. (for furrowed bowls) would make sense of some radiocarbon dates. It lies at the early end of the range for the radiocarbon dates from the round houses of Longbridge Deverill Cow Down."

(Avery, 1981, 38)

In the case of the other radiocarbon dates which he uses, it is my contention that the associations between the samples and the pottery are so tenuous as to render any interpretation meaningless. First, let us consider whether the sherds of furrowed bowl and the radiocarbon dates at Shearplace Hill, Sydling St. Nicholas were indeed, in the words of Avery, "reasonably well associated" (1981, 38). The date of 1180 ± 180 b.c. (N.P.L. 3130 ± 180 bp) was obtained from wood charcoal collected from five locations throughout the site (Rahtz and Apsimon, 1962, 325) and these, according to Avery and Close-Brooks' reinterpretation of the history of the site (1969), belong to Phases 1 and 2 (though it is hard to see how sample 3 could be securely assigned to any phase); none was associated with furrowed bowls. The sherds themselves, originally published as sherds from a globular urn, came from two locations on the site - from Hearth F.9 which overlay the inner ditch (1962, fig. 17, no. 18) and from the lower levels of post-hole 46, later interpreted as belonging to the reconstruction of House A1 (House A2), and thus to Phase 2. In short, the "association" is between a composite sample from two phases on the site and pottery tentatively assigned to the second of those phases. Moreover, having calibrated the date according to Clark's curve which yielded a range of dates between the twentieth and tenth centuries (at the 95% probability level) Avery points out that "a date in the eleventh century B.C. lies at the later end of the range" (Avery, 1981, 38).

The association between the third sample and the pottery it purports to date is equally tenuous. The sherd - a fragment of the neck and shoulder of a fine carinated vessel of grey ware, attributed by some to the furrowed bowl class¹ - lay on the upper surface of a peat deposit at

¹ Definite attribution must depend on first-hand examination of the sherd in view of the inadequacy of the illustration; this I have not done.

the site of Barmston, Holderness (Varley, 1968) cut down from which, but at a distance of thirty metres, was a pit lined with birch stakes, one of which yielded a date of 940 ± 150 b.c. (B.M. 123); when calibrated in the same manner this yielded a range between the sixteenth and the ninth centuries B.C. My main objection does not concern the tenuousness of the sherd's attribution to the furrowed bowl class - though admittedly it lies far outside the area of primary distribution of these vessels - but rather the difficulty of establishing any reliable stratigraphic relationship between the pottery on Site B and the sample on Site A from the two schematic sections provided in the report; without this vital link it is quite possible to suggest an alternative sequence, as did Varley, with deposition of the pot being seen as subsequent to that of the timber and the date thus being merely a *terminus post quem* for the furrowed sherd.

If sensible dates for the currency of furrowed bowls cannot be extrapolated by this means - for it is clear that even if the dates cited above had been directly related to the pottery they purport to date they would merely have indicated that furrowed bowls were in use *at some time* between the twentieth and fifth centuries B.C. (using Clark's curve and calibrating at the 95% probability level, *pace* Avery) - nor yet by comparison with the Welby cup, then continental assemblages must be searched for comparable well dated material; such an approach constitutes Avery's second, and principal, method. Since consideration of every assemblage cited in his lengthily annotated article would be both tedious and unnecessary - on the basis of published material he discusses over fifty assemblages from the Alps to the mouth of the Rhine - I wish rather to examine his methodology.

Recognising that furrowing is a long-lived technique found in a variety of guises on numerous Urnfield and Hallstatt Iron Age ceramic types (for this see Kimmig, 1940, 90-94; Daugas et Petrequin, 1970, 408), Avery's approach is to seek the earliest combined occurrence on the Continent of the two traits which he believes can be used to define our furrowed bowls - the use of "wave"- and "groove"-sectioned horizontal channels on low, wide mouthed carinated bowls - and to assign that date to the British material; arguing that such a combination of decoration and shape is to be found most convincingly in HaA2 contexts in the Middle Rhine, he suggests an eleventh century date for the advent of furrowed bowls. My main objection does not concern his failure to explain the mechanism of the style's transference to Britain (37-38) nor even the fact that such Rhenish vessels do not compare as closely with British furrowed bowls as he would have us believe - though the latter point certainly merits attention. When illustrations of British vessels are set beside those of the Continental examples considered by Avery to be "compelling parallels", as here in Figure 1 - such an illustration has been omitted from both of Avery's discussions of this topic - numerous differences in profile, rim, base, capacity and even furrowing are immediately apparent; moreover, the Continental vessels, a motley collection comprising biconical, tripartite, sharply carinated and round-bodied vessels, evince several traits common to other vessel types in the assemblages cited which are invariably absent from their supposed British "counterparts", traits such as the markedly everted flat-topped rim and the combination of furrowing and vertical channelling. For an argument which seeks to establish contemporaneity on the basis of stylistic similarity, such "parallels" are unhelpfully dissimilar.

FIG.1

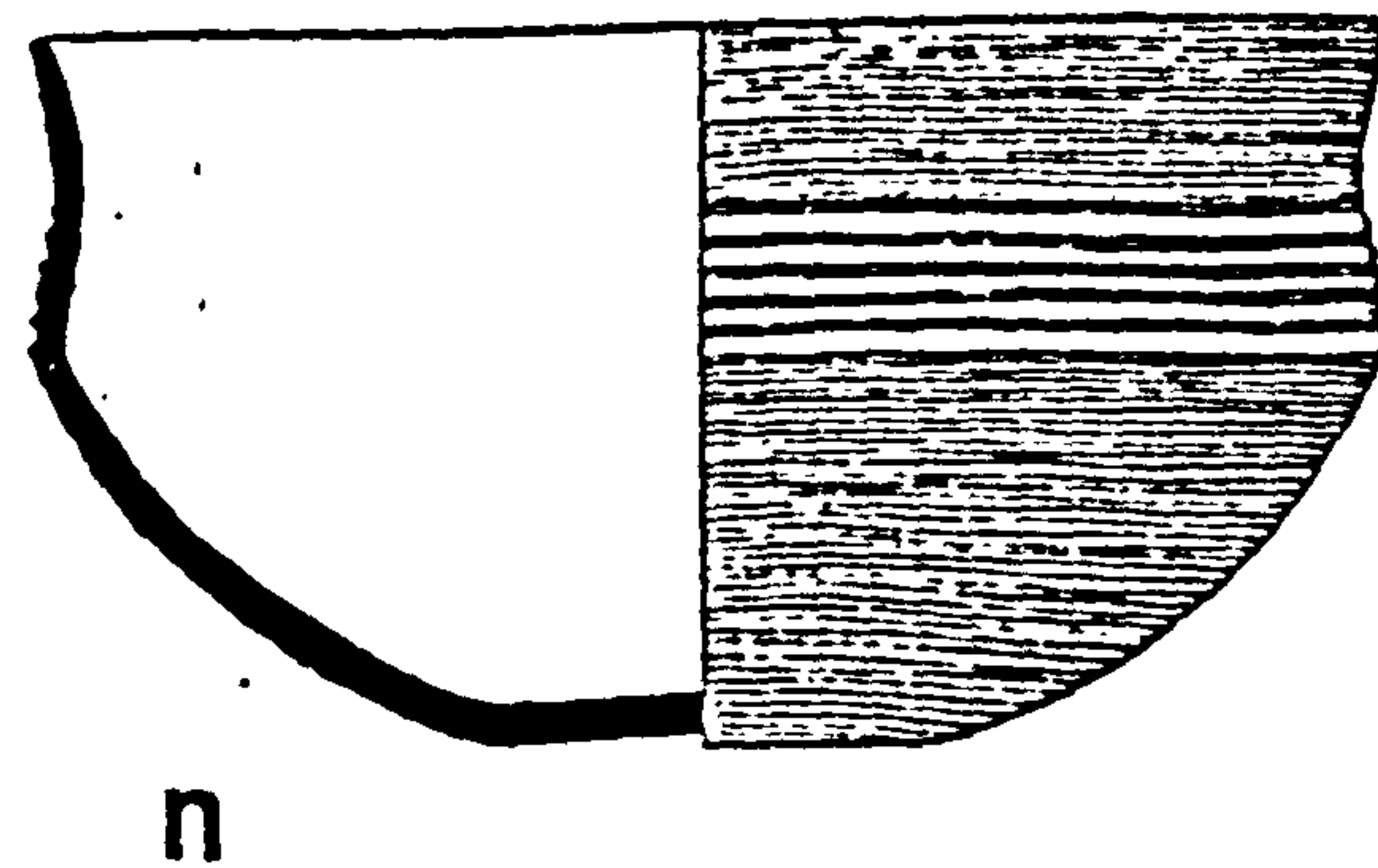
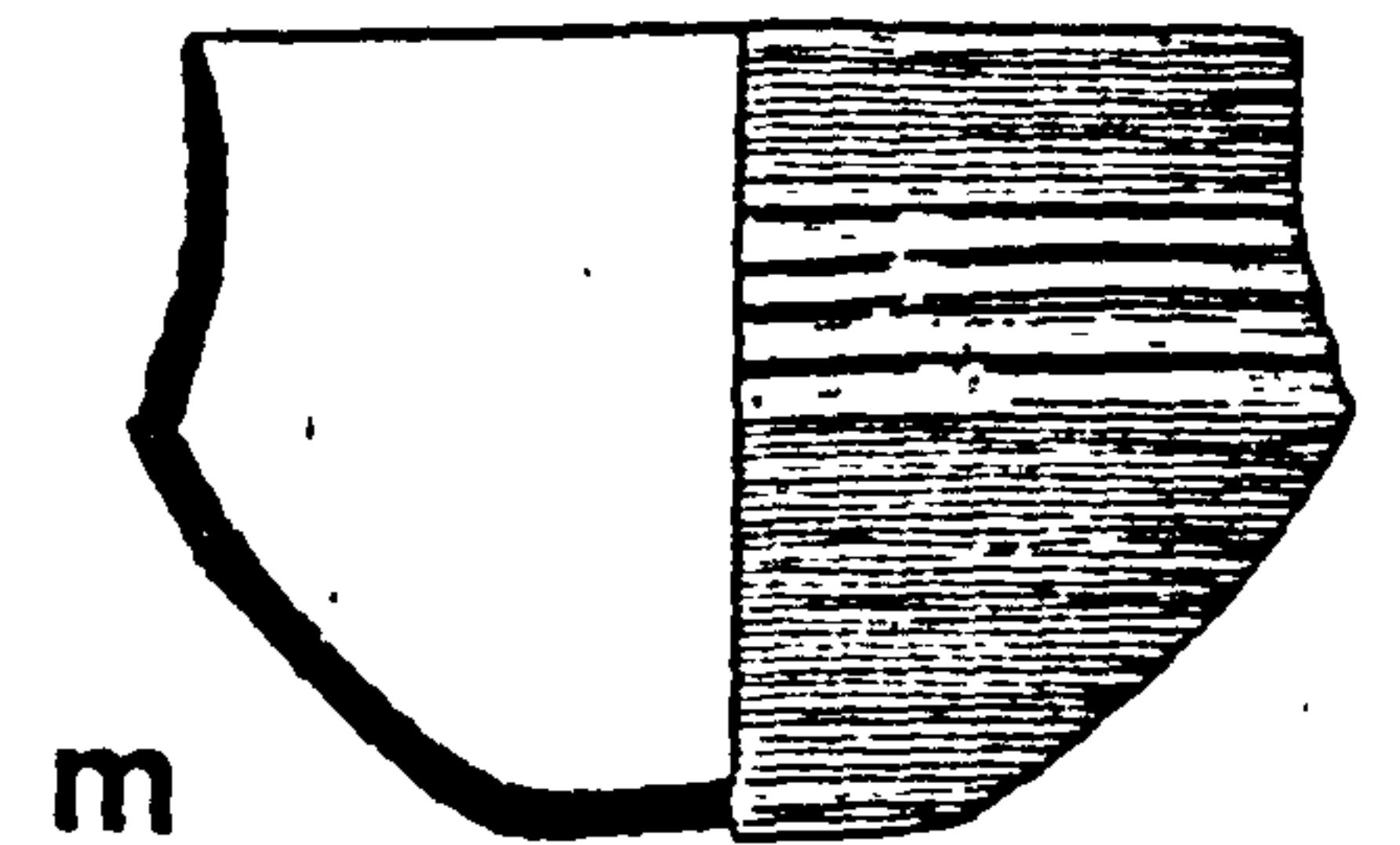
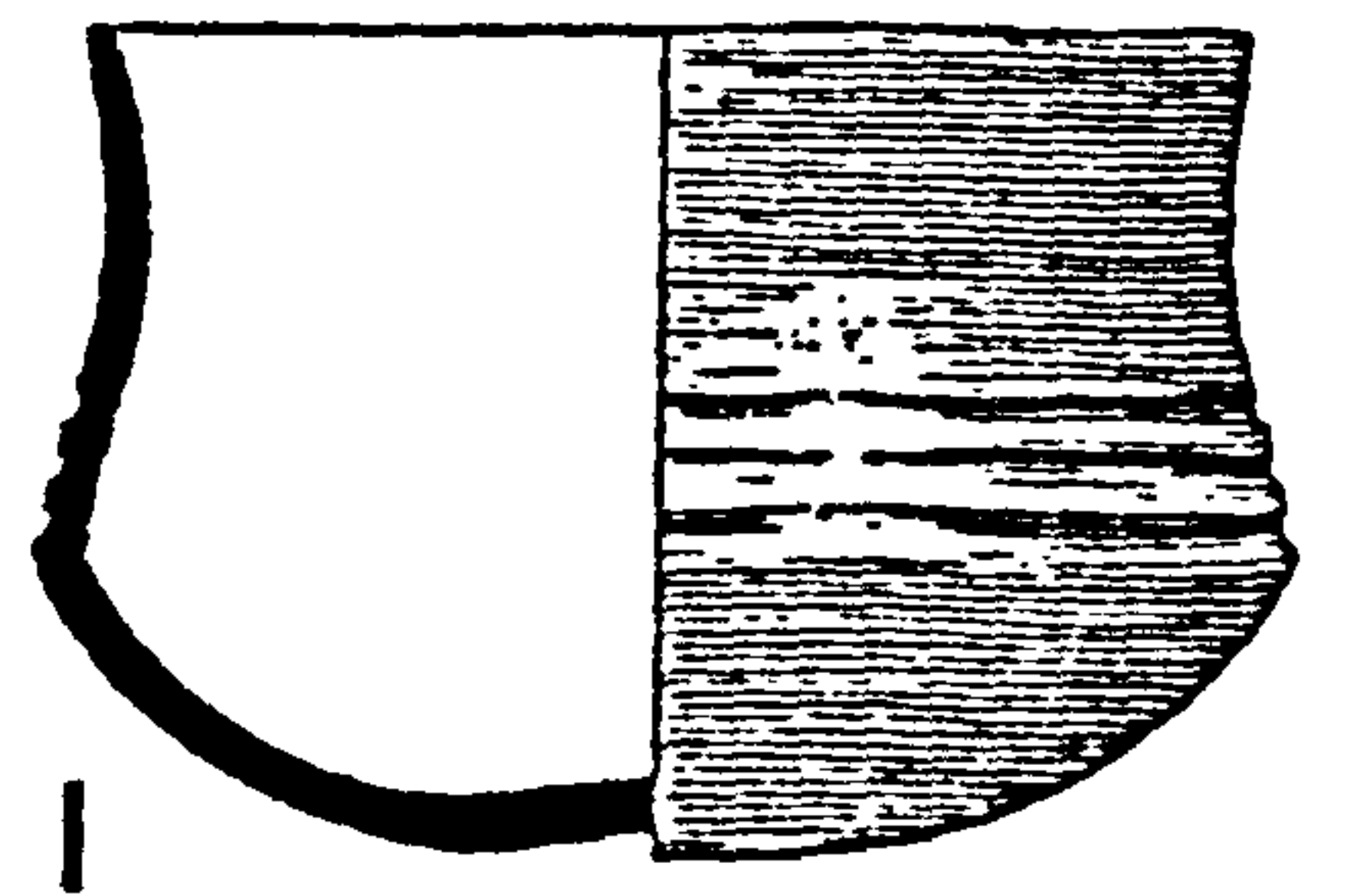
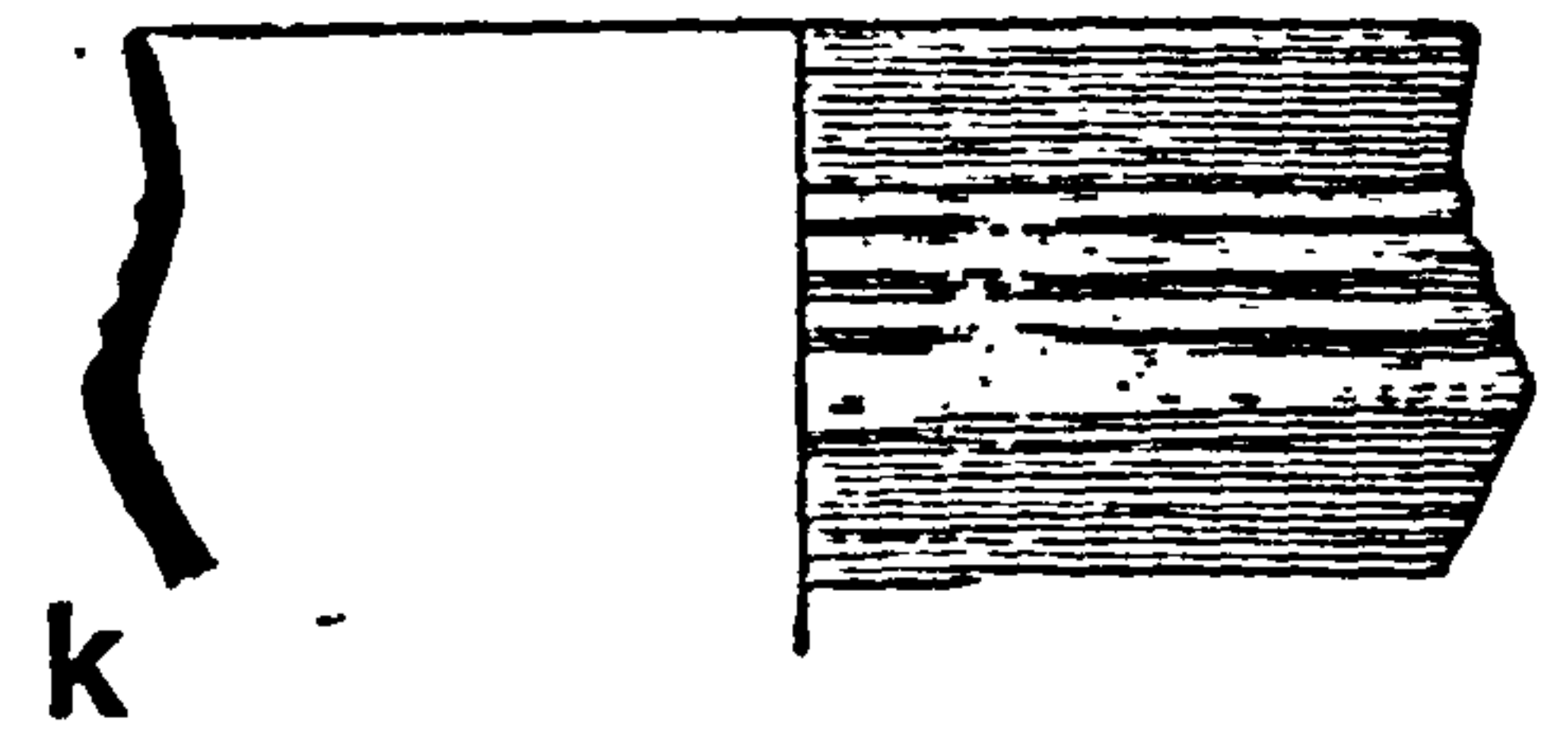
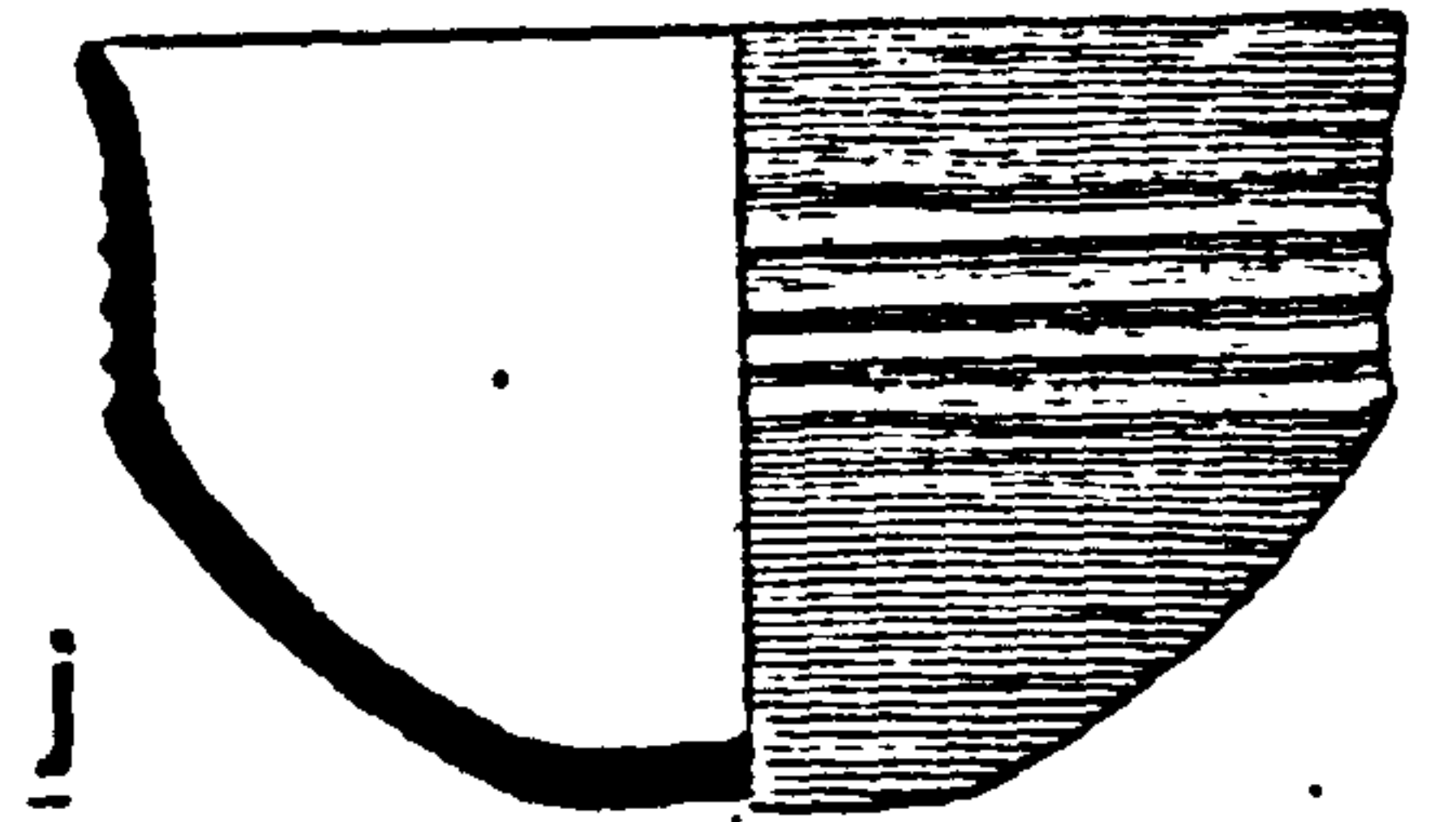
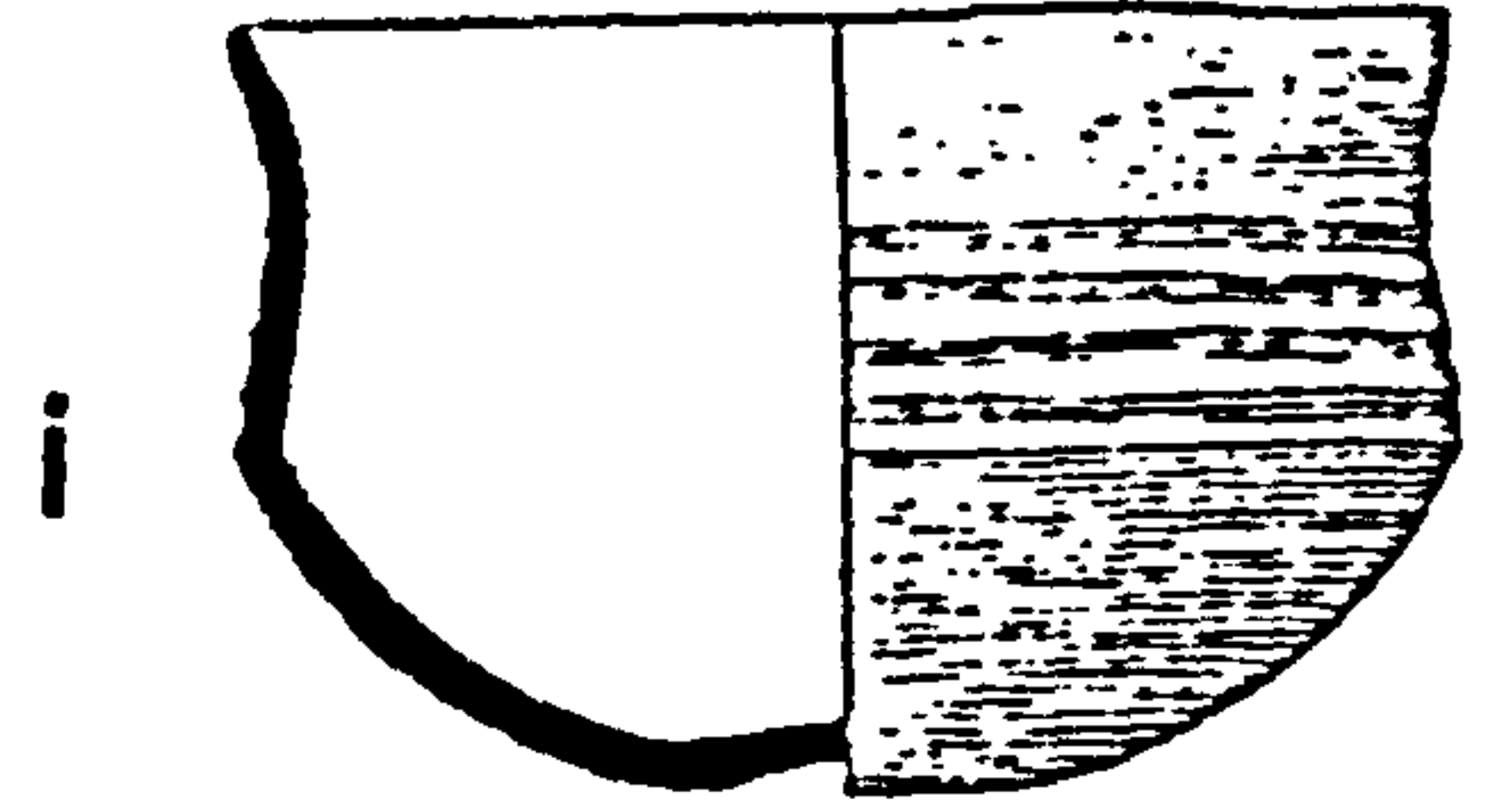
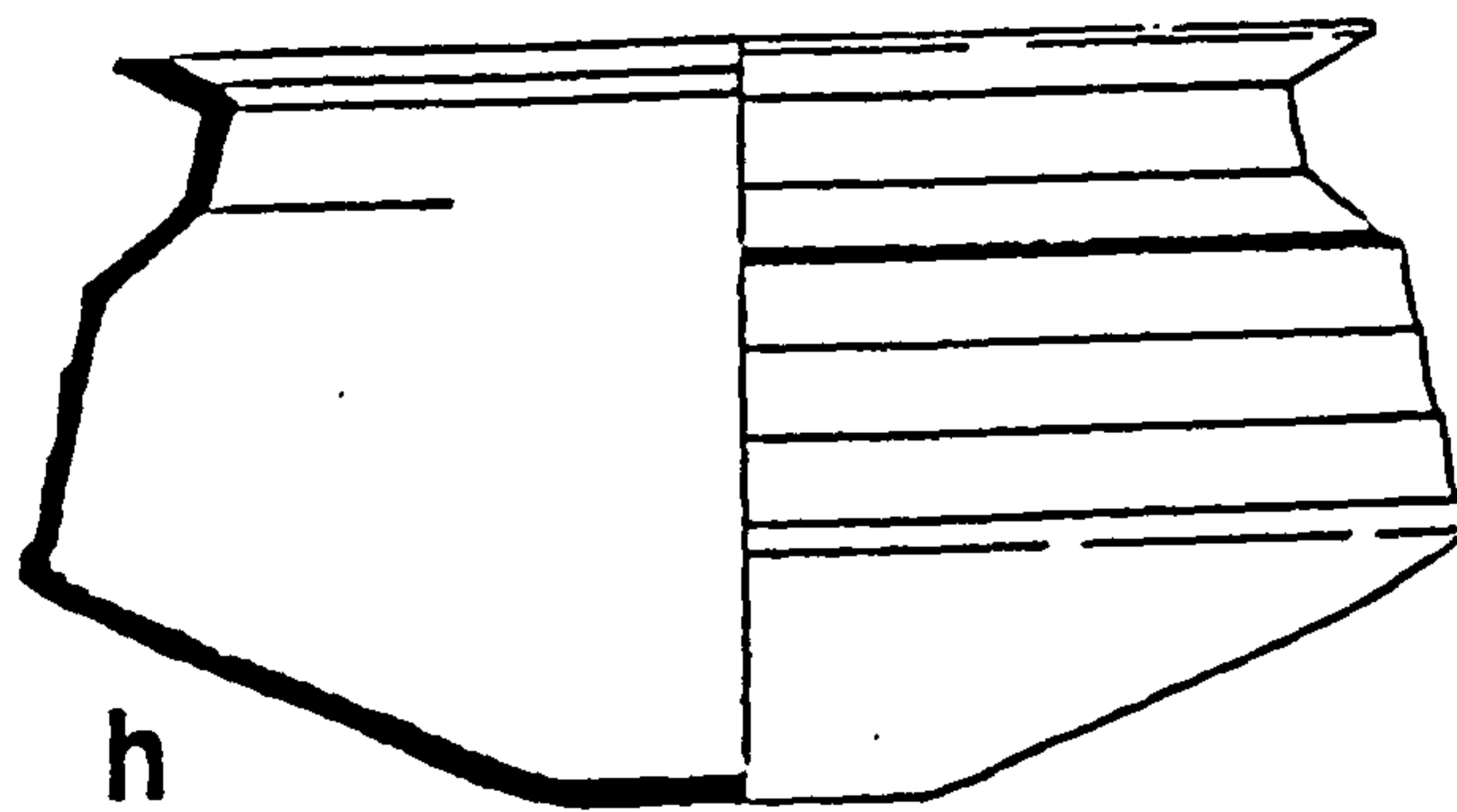
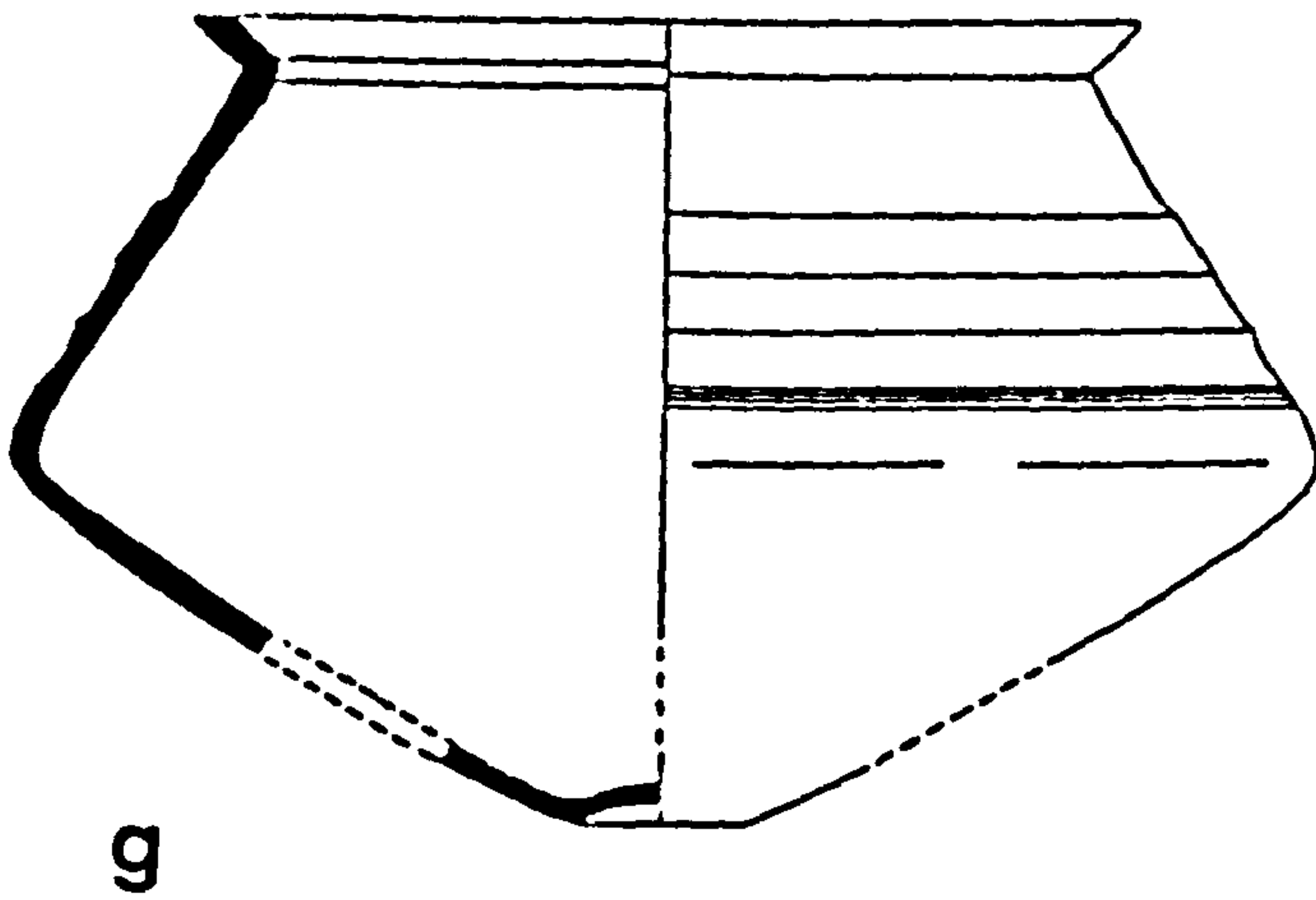
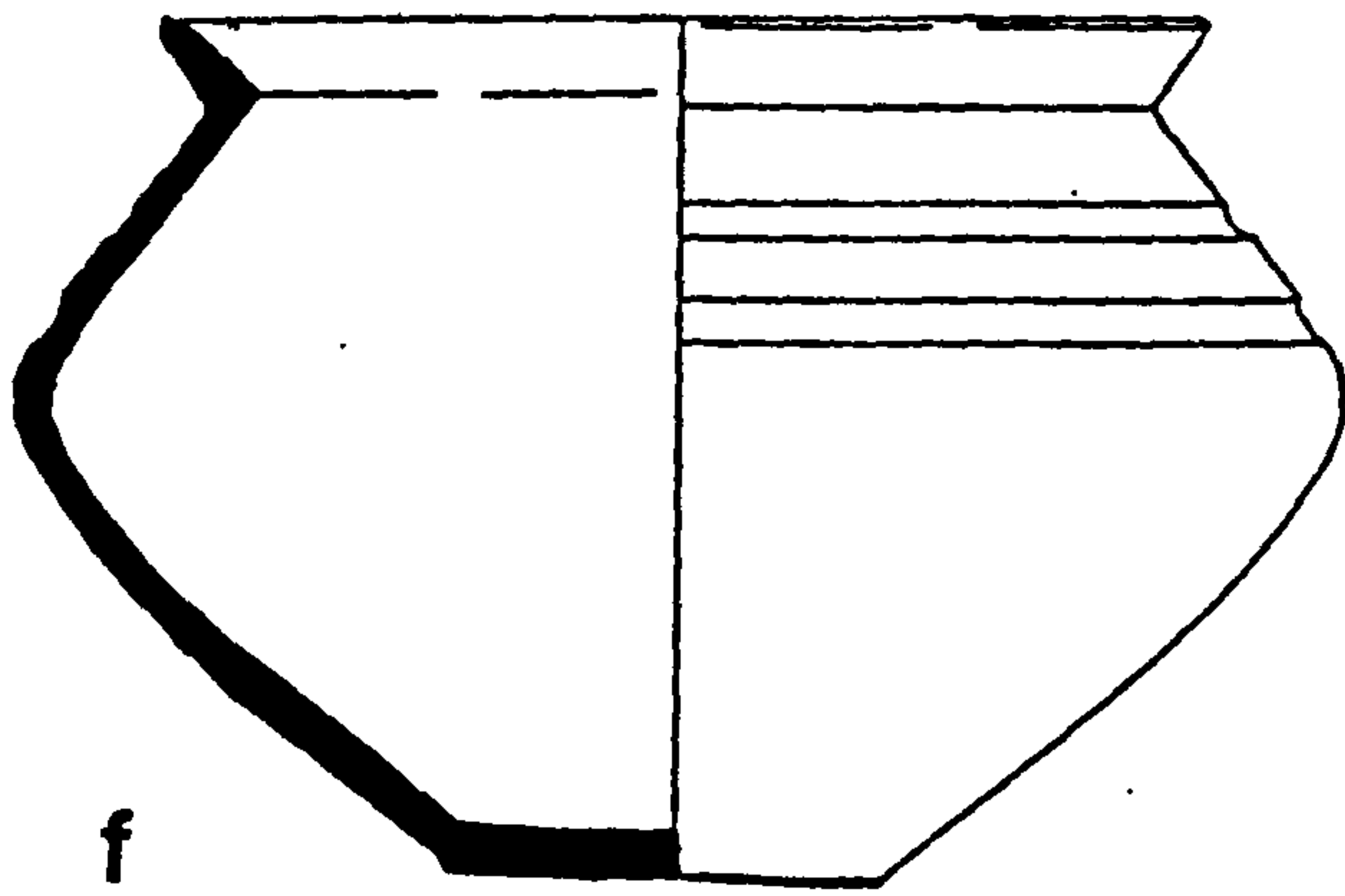
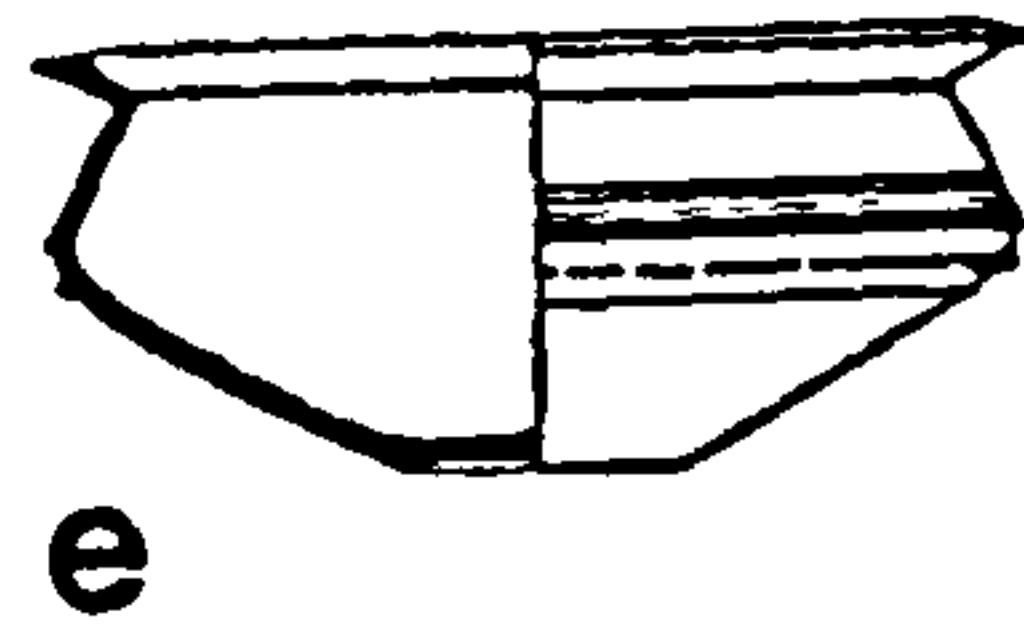
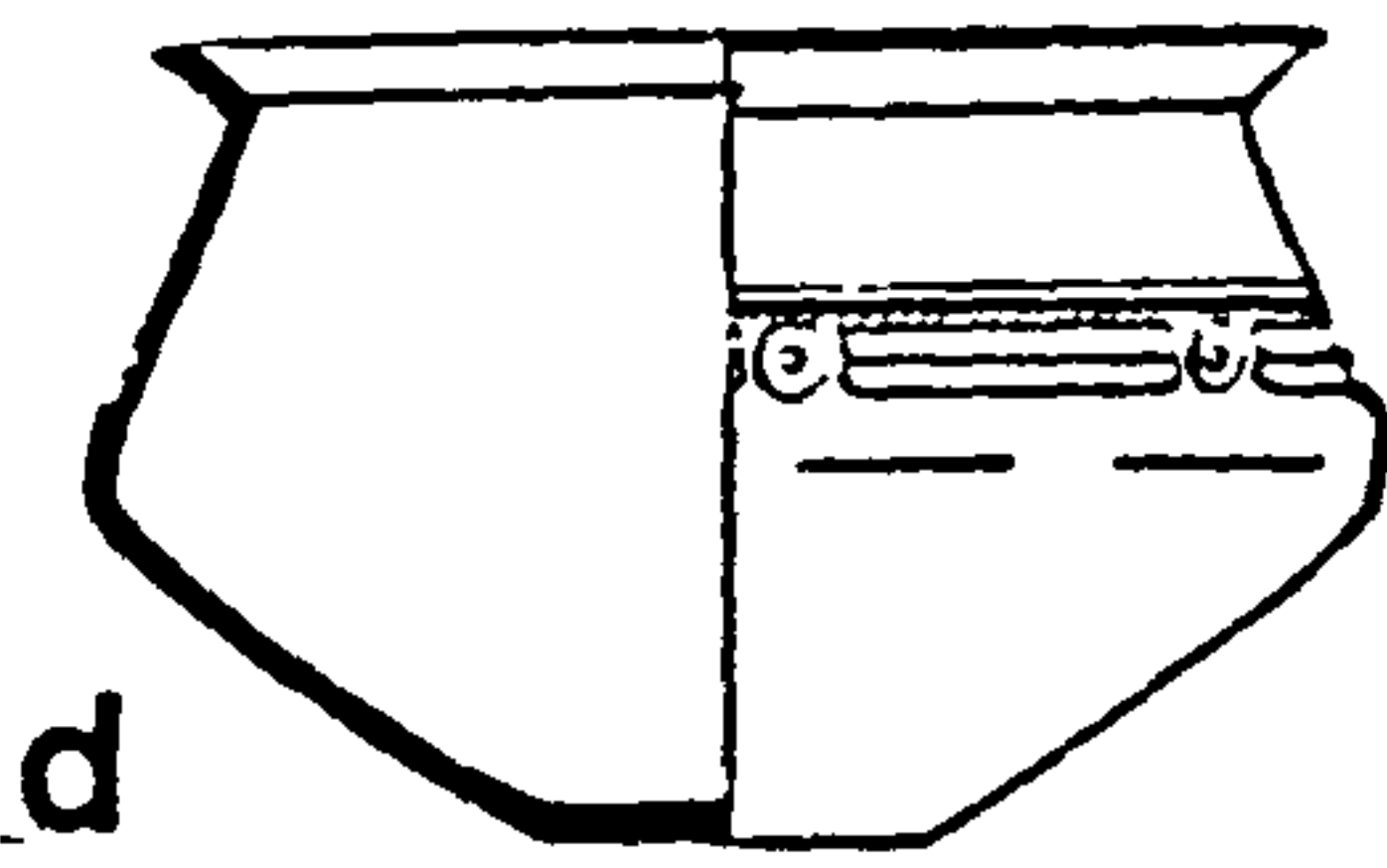
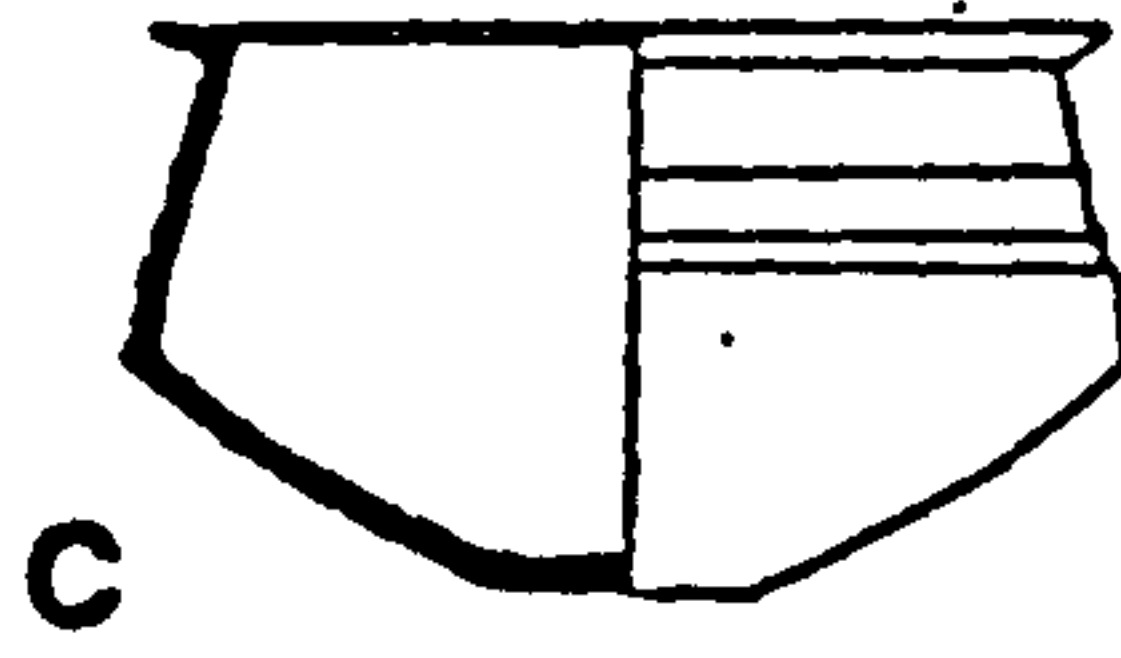
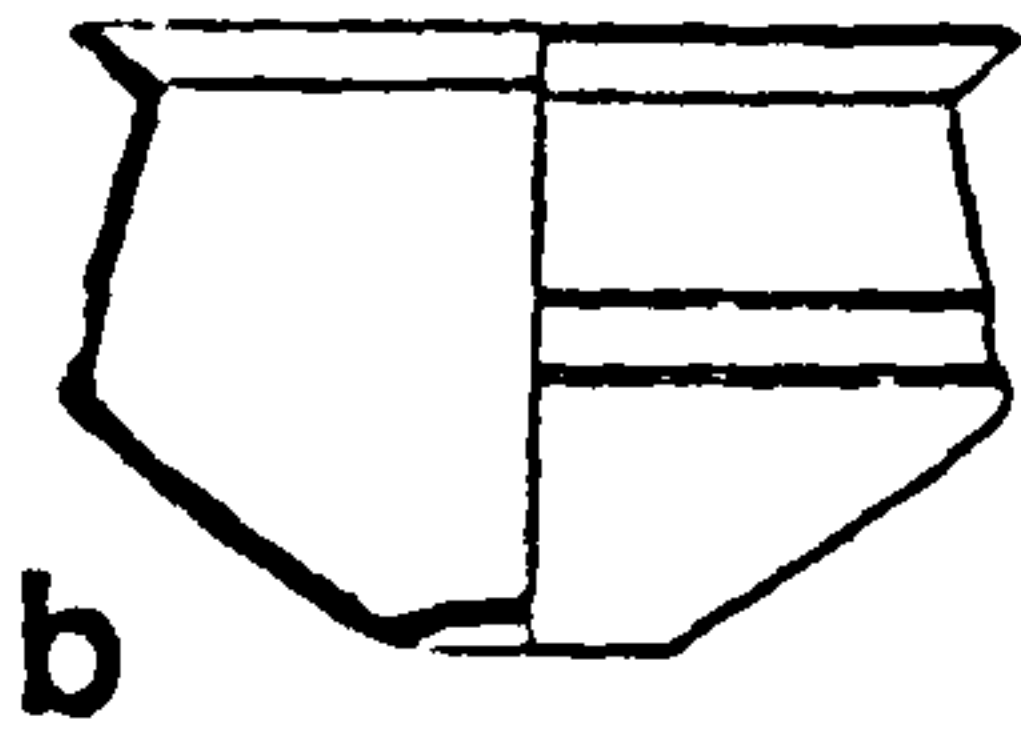
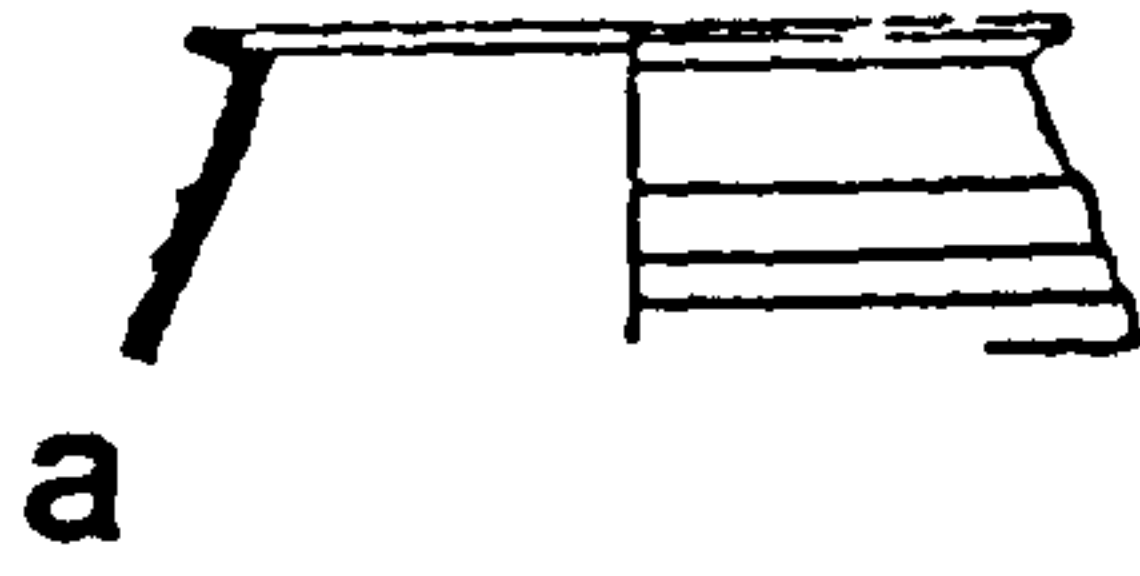


FIGURE 1 : Channelled and furrowed bowls.

Scales: a-e, g-h 1 : 4
 l-n 1 : 3
 f unknown

- a FRANKFURT-SINDLINGEN, Sdl. FRIEDENAU
 (Hermann, 1966, Taf. 74. A₂).
- b PFUNGSTADT, Kr. DARMSTADT
 (Hermann, 1966, Taf. 153. B₁).
- c FRANKFURT-SINDLINGEN, Sdl. FRIEDENAU
 (Hermann, 1966, Taf. 74. A₁).
- d HORLACH, RUSSELHEIM
 (Hermann, 1966, Taf. 168. A₃).
- e ESCHBORN, Kr. MAIN-TAUNUS
 (Hermann, 1966, Taf. 83. C₃).
- f SANDGRUBEN, Kr. FRIEDBURG
 (Hermann, 1966, Taf. 122. B_a).
- g MERTEN, WIESBADEN-ERBENHEIM
 (Hermann, 1966, Taf. 99. C₂₅).
- h DIETZENBACH, Kr. OFFENBACH
 (Hermann, 1966, 12).
- i-n ALL CANNINGS CROSS, WILTSHIRE
 (Harding, 1974, Fig. 41).

My main objection, however, concerns Avery's selection of shape and furrowing as the basis of his chronological argument, and his failure to include other equally significant traits, consideration of which would markedly alter his chronological conclusion. First, it is clear from the descriptions given in Zumstein's (1964, 1965) and Hermann's (1966) catalogues that none of the vessels which Avery cited as comparisons were coated with a haematite slip but were merely of grey, brown and black burnished wares; the majority of British vessels on the other hand are so coated. Avery does indeed list a few British sherds which have grey, brown or black surfaces (1981, app. A) but until these have been subjected to first-hand examination and scientific analysis (*contra* Avery, p. 60) it must not be assumed that they lacked a haematite slip; on the contrary, there is some evidence to suggest that such colours may result from firing ferruginous slips in reducing or ill-controlled temperatures (see Searle's report on the Chinnor pottery in Richardson and Young, 1951, and consider also the patchy surfaces of sherds from Hengistbury Head, All Cannings Cross, etc). Even if this proved not to be so, it remains the case that the majority of British furrowed bowls were covered with a haematite slip, a fact which ought not to be overlooked in any discussion of the type.

Secondly, Avery fails to take account of the frequent association of furrowed bowls both in Wessex and in Berkshire (Barrett, 1975, 106-7, 109) with sherds of jars and bowls which evince stabbed and incised geometric decoration, frequently filled with a white inlay. If his chronological argument is correct then this form of decoration should likewise be found in eleventh century contexts on the Continent (unless, of course, independent invention is to be evoked); a search through Hallstatt A assemblages from France, Germany and the Netherlands

(Guilaine, 1976; Kimmig, 1940; Hermann, 1966; Desittere, 1968) failed to produce any such examples.

If a realistic date for the beginning of the British furrowed bowl series is to be extrapolated from Continental material, then we should be seeking assemblages which embrace the use of furrowing on carinated bowls, the application of haematite slips and the use of inlaid and incised decoration; it is amongst some of the later assemblages dismissed by Avery - his refutations are noticeably less closely argued than are his prosecutions of early dates - that such a combination of traits is to be found, and it is the date of these rather than that of the eleventh century assemblages discussed above that I suggest should be applied to our British material. The topic, however, needs considerably more attention than I have been able to afford it, and thus the following proposals are merely offered as suggested avenues for future research.

The suggestion that Late Urnfield assemblages from East France provide good parallels for the traits listed above has frequently been advanced (most recently by Cunliffe, 1978a, 33; O'Connor, 1980, 285) but bears re-investigation in the wake of Avery's article; Table 5 below sets out the chronological scheme applicable to the four areas under consideration.

Table 5:

BRONZE FINAL	IIa	Ha.A1
	IIb	Ha.A2
	IIb	Ha.B1
	IIIa	Ha.B2
	IIIb	Ha.B3

(based upon Zumstein, 1964)

In her seminal work of 1957, Sandars illustrated material from several sites in the Jura-Franche Comté area (1957, 213-8, figs 53-5) - Baume-les-Messieurs, Réculée de Ney, Camp de Montmorot, Rolampont, Lac de Chalain and Mont Guérin - which includes biconical furrowed bowls with short everted necks and simple rims, vessels coated with a haematite slip (fig. 54, 8,9) and sherds decorated with incised geometric decoration. These she dated to Bronze Final III, a date likewise ascribed to the material from Baume-les-Messieurs by Daugas and Pétrequin (1970, 398-9); more recently, Wamser (1975, 21-2, 151) has dated the latter four sites to Ha.B2/B3. Horizontal channeling on omphalos-based biconical bowls and the use of stamped and incised decoration is likewise found together in ninth-eighth century contexts in the Swiss "Groupe des Palafittes du Bourget", Bocquet's "Bronze Final phase récente" (Bronze Final IIb/Hallstatt C), the techniques of incised decoration and white inlay having spread to this area during the previous phase (phase moyenne, Bronze Final IIb-IIIa; eleventh-ninth centuries B.C.) under the influence of Kimmig's Rhine-Swiss ceramic group (Kimmig, 1940; Bocquet, 1976, 490; fig. 5, 1-8). Furthermore, incised inlaid decoration appears in Burgundy towards the end of Bronze Final III (Bonnamour *et al.*, 1976, 615), as it does, together with the use of geometric decoration, in Bronze Final III contexts in the Upper Rhine (Zumstein, 1965, 53). Thus all the traits which occur among our early decorated assemblages are current during the ninth and eighth centuries in Eastern France and the West Alpine area, areas with which Southern England was in close contact during the Ewart Park industrial tradition as shown by both metallurgical (for a discussion of Alpine 'S' metal, see Northover, 1982) and typological analysis; O'Connor (1975; 1980, Ch. 6)

has demonstrated the strength of West Alpine influence, via North-Eastern France and Belgium, on Ewart Park industries, pointing to such artefacts as phalerae, single-edged solid hilted knives, fish-hooks, chapes, bracelets and antler cheek-pieces.

However, since the diffusion of ceramic technology tends to be more restricted than that of bronze it is probably more reliable to consider those assemblages which occur in areas somewhat closer to Britain, such as the Bronze Final III material from the Saint Gond (Marne) region to which Sandars first drew attention (1957, 218-225; Brisson and Hatt, 1953, 1967) and that dating to Ha.B/C from Friedin's recently defined Seine-Marne area (Champagne-Pouilleuse, Lower Marne, Middle Seine; Freidin, 1982); assemblages from these areas contain furrowed biconical bowls, vessels decorated with incised, stamped and inlaid geometric designs and sherds coated with a red slip. Biconical bowls with short everted necks, simple rims and furrowing above the shoulder are likewise to be found in Bronze Final III contexts lower down the Seine, as at Draveil (Mohen, 1977, 182, 690-1), one of a number of assemblages which Mohen allies to Brisson and Hatt's material in the Champagne (Mohen, 1977, 162).

Barrett's eighth century date (see above) for the introduction of the ceramic types which form his decorative assemblages thus concurs with that of similar Late Urnfield material from Northern France (fig. 2), and it is his scheme rather than those of Champion and Avery that I shall use in the following section. Such a scheme sees decorated assemblages as continuing into the fifth century B.C. - dates of 490 ± 90 b.c. and 470 ± 60 b.c. (Har 256, Har 254) were obtained from posts in House 4 at Longbridge Deverill Cow Down, which reputedly contained "fine haematite coated First A" ware

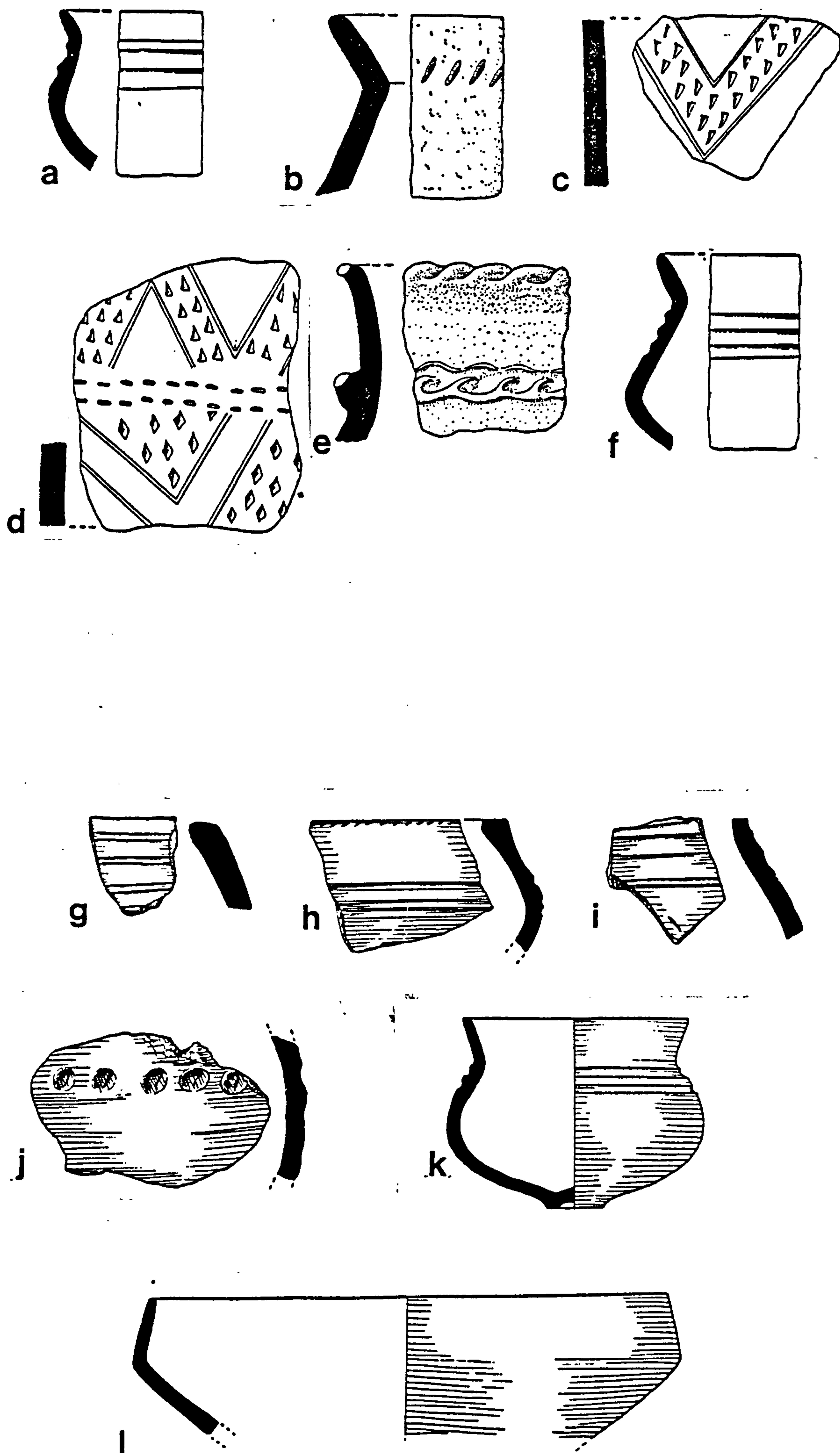


FIG. 2

FIGURE 2 : Bronze Final III vessels from Eastern and Northern France.

Scale 1 : 2

- a COURCHAPON, Doubs.
(Sandars, 1957, fig. 53.10).
- b COURCHAPON, Doubs.
(Sandars, 1957, fig. 53.11).
- c GROTTES DES ROCHES, Jura.
(Sandars, 1957, fig. 51.5).
- d GROTTES DES ROCHES, Jura.
(Sandars, 1957, fig. 51.6).
- e CAMP DE MONTMOROT, Jura.
(Sandars, 1957, fig. 54.8).
- f MONT GUÉRIN, Jura.
(Sandars, 1957, fig. 54.9).
- g VILLENEUVE ST GEORGES, Val de Marne.
(Mohen, 1977, 181, fig. 675).
- h VILLENEUVE ST GEORGES, Val de Marne.
(Mohen, 1977, 182, fig. 681).
- i VILLENEUVE ST GEORGES, Val de Marne.
(Mohen, 1977, 182, fig. 685).
- j VILLENEUVE ST GEORGES, Val de Marne.
(Mohen, 1977, 182, fig. 687).
- k DRAVEIL, Essonne.
(Mohen, 1977, 183, fig. 690).
- l VIDELLES, Essonne.
(Mohen, 1977, 183, fig. 693).

(Hawkes, 1961) - but discussion of the demise of this tradition must await consideration of the dates of comparative assemblages from other regions.

PRIMARY CATALOGUE

ALL CANNINGS CROSS, All Cannings

SU 080634

All Cannings Cross Farm, Allington, approximately 10 kms east of Devizes. Unenclosed settlement site situated in arable land on a gentle slope (between the 500 and 600 foot contours) at the foot of the Downs. Discovered by field-walking in 1911 and excavated in that year and in the autumns of 1920-22 by B.H. and M.E. Cunnington. Eight areas totalling approximately 16,000 sq. metres were opened revealing 75 pits, post-holes and areas of flooring; no trace of an enclosing bank or ditch was recognised. Apart from those from the pits, the finds came from a layer of humus between 7 cm and 56 cm thick which covered the entire site, and comprised worked bone and antler, saddle querns, sarsen rubbers, flint artefacts, chalk loomweights, baked clay artefacts, human and animal bone, pottery, bronze and iron artefacts, crucibles, ore and slag. Further evidence of metalworking derives from pits 4, 6, 43 and 56, the former containing a possible tuyère (Pl. 1). A complete list of the extant metalwork is given below.

Bronze

Fragment of an Armorican axe (Pl. 2)

Concentrically ribbed button

Tweezers

Notched tanged razor

Penannular brooches: 2 (C. Pl. 18.1, 116; Pl. 19.1, 121)

Bracelets: 5 (C. Pl. 18.2, 116; Pl. 18.4, 119; Pl. 18.5, 119;
Pl. 18.6, 119; Pl. 18.8, 119)

Awls: 3 (C. Pl. 18.7, 119; Pl. 19, 3, 121; Pl. 19.4, 121)

Fibulae: 3 (C. Pl. 18.12, 120; Pl. 18.13, 120; Pl. 18.14, 120)

Miscellaneous: fragment of thin bronze with two perforations
strip of embossed bronze
small ring
fragment of a socketed knife?
piece of bronze wire
brooch pin fragment
awl?

Iron

Awls: 7 (C. Pl. 19.7; Pl. 20.6-8; Pl. 21.6)

Sickle: (C. Pl. 20.3)

Knife
blades: 7 (C. Pl. 20.10-16)

Pins 4 ring headed pins (C. Pl. 20.4; Pl. 21.2-4)
1 thistle headed pin (C. Pl. 21.5)
1 swan's neck pin (C. Pl. 21.1)

Fibulae: 4 (C. Pl. 19.10; Pl. 21.7-9)

Gouges: 3 (C. Pl. 20.1, 2, 9)

Bracelets: 2 (C. Pl. 20.5)

Tweezers: 2 (C. Pl. 21.12)

Miscellaneous: square sectioned rod of iron
2 spatulate objects (C. Pl. 21.10)
riveted piece of iron (C. Pl. 21.11)

Bibl.: Cunnington, 1911-12, 526-38; 1922, 13-19; 1923; V.C.H.
(1957), 24; D.M.C. (1934), 86-90.

Mus.: D.M. houses the principal collection, but further material is to be found in the B.M., N.M.A.S., County Museums and private collections.

BOSCOMBE DOWN EAST, Allington

SU 23183724

A Deverel Rimbury rectilinear enclosure, 0.1 hectares in extent with internal bank and ditch, on the north-west slopes of the Downs. In 1935 Stone sectioned the ditch in places and stripped 0.5% of the interior; the latter exercise revealed no features. His excavations produced bone, flint and stone artefacts, and pottery, but no metalwork, except for a putative piece of iron slag in Layer 3 of the ditch - hence the site's inclusion here; this find is, however, doubtful (see below).

Bibl. W.A.M., xlvii, (1935-7), 466-89; P.P.S., II, (1936), 216, V.C.H. (1957).

Mus.: Sal. (slag - 38/36)

BUDBURY, Bradford-on-Avon

ST 82136113

A two-and-a-half hectare double ditched promontory fort (largely obliterated by housing) overlooking the valley of the River Avon on the northern outskirts of Bradford-on-Avon. Excavated by Underwood in 1945 and more extensively by Wainwright in 1969; the latter cut 6 sections through the outer ditch, eight through the inner, totally excavated the extant stone box-rampart and stripped an area lying within the northern angle of the defences revealing pits, postholes and a rectilinear posthole structure with hearth. Large quantities of Iron Age pottery were recovered from the site together with the metal objects

listed below, flint-work, baked clay artefacts, stone saddle querns and spindle-whorls, worked antler and bone, and fragments of shale bracelets; Romano-British and post-Roman material occurred across the site in the upper levels.

Bronze

Penannular ring

Fragment of a finger-ring

Piece of bronze rod

Bronze slag

Iron

Two iron knives, one curved, the other with riveted tang, and three fragments of knives, one within an antler socket

Chisel?

Ploughshare?

Pointed iron rods - 2

3 indeterminate objects

2 angle clamps

Bibl.: Wainwright, 1970.

Mus.: D.M.

COLD KITCHEN HILL, Brixton Deverill

ST 833387

The site, which lies on Whitecliff Down on the lower slopes of Brimsdown Hill, comprises the following elements: a) a settlement (apparently unenclosed) approximately 91 metres in diameter consisting of a series of depressions, some circular; b) a square Romano Celtic

temenos to the west of a); c) a Romano-British masonry building; d) a large mound in the centre of a). Excavations have been conducted on the complex by Cunnington (1803), Stratton (1892), Goddard (1893) and Nan Kivell (1924-6 - in the settlement area); surface finds have been made subsequently. The reports of these campaigns simply comprise catalogues of unstratified material, too numerous to list in detail but including bronze and iron ring headed pins, bronze and iron La Tène fibulae, bronze and iron penannular brooches, iron sword chape, bronze terret, bronze flanged tanged knife, iron socketed axe, iron involuted brooch, bronze razor, iron tanged knife, bronze bracelets, bronze tweezers, Roman metalwork and coins, worked bone, baked clay artefacts, possible crucible fragments, shale armlet and pottery (sherds of decorated, saucepan and Durotrigian vessels).

Bibl.: W.A.M. xxvii (1893-4) 279-91; xxix (1896-7) 181; xxxii (1901-2) 169; xxxv (1907) 406-7; xxxvii (1911-12) 131, 148; xliii (1925-7) 180-91; 327-32; xliv (1927-9) 138-42; xlv (1930-2) 178; xlviii (1937-9) 185-9; lxiii (1968) 118; Man, xxi (1921) 132-3; D.M.C. (1934) 115-30.

Mus.: D.M.

LIDBURY, Enford

SU 166533

An almost square 0.3 hectare univallate enclosure with counterscarp bank, single entrance and surrounding ditch system on Littlecott Down, Enford. M.E. and B.H. Cunnington conducted a short campaign of excavation in 1914, sectioning the defences in 17 places and trenching "a great part of the interior" (Cunnington, 1917, 15). The latter exercise revealed eleven pits containing a wide range of material, from

coarse fingertip and fingernail decorated jars, at least one cordoned haematite vessel, smooth dark ware, plain coarse shouldered jars of the type found at Little Woodbury, sherds with zig-zag ornament incised after baking and an opaque yellow glass bead thought to date to the second century B.C. Two phases of ditch construction were evident, the older running beneath the enclosure's rampart for part of its length, but both respected the same entrance and would appear from their contents to be roughly contemporary. A considerable quantity of pottery decorated with fingertip and nail impressions on rim and shoulder was found stratified in the lower levels of the main ditch from the bottom of which came a fragmentary iron socket; later Iron Age and Romano-British material was found in the upper levels.

Bibl.: W.A.M. XL (1917), 12-36; D.M.C. (1934),

V.C.H. (1957), 69.

Mus.: D.M.

MELKSHAM BY-PASS, Melksham

ST 90026388

Nine individual finds made during river-widening operations in 1971, and presented to Devizes Museum in 1972 and 1981. Considered to constitute a hoard on grounds of the similarity of their patination, the presence of iron staining on one of the bronzes and of gravel in the sockets of the spearheads, their discovery in a comparatively restricted findspot and the scrap nature of one of the items (*pace* Gingell, 1979).

3 bronze pegged leaf-shaped spearheads

2 iron socketed spearheads

1 bronze? dagger blade

3 bronze phalerae

Bibl.: Gingell, 1979

Wilts. Arch. and Nat. Hist. Soc. Ann. Rep., 1981, 8, fig. 5.

Mus.: D.M.

OLIVER'S CAMP, Bromham

SU 00156470

A 1.3 hectare univallate trapezoidal promontory fort with timber-box rampart, three kms north-west of Devizes. The defences were sectioned and 46 narrow trenches laid across the interior by B.H. Cunnington in 1907. Few features were revealed other than hearths (two in the interior and three under the ramparts) and a posthole relating to the rampart structure. Sherds of haematite bowls and coarse finger decorated jars were found stratified in primary positions across the site. Further details of the site are not considered necessary, for reasons apparent in the discussion.

Bibl.: W.A.M. xxxv (1907-8) 408-44; Hawkes (1931) 92; Hawkes and Dunning, 1932, 427; D.M.C. (1934) 147-9; Grinsell, 1957, 51; Wainwright, 1960, 148.

Mus.: D.M.

DISCUSSION

The earliest occurrence of iron in Wiltshire has for long been thought to be that from Boscombe Down East, Allington, a Deverel-Rimbury ditched enclosure with internal bank dug by Stone in 1935; layer 3 of the ditch, undisturbed bank-silting, yielded sherds of flint-gritted Deverel-Rimbury pottery (Stone, 1935-7, Pl. IV, figs. 15 and 16) and a putative piece of iron slag (*ibid*, 284). Though Dr. Hallimond originally identified the latter as "a highly oxidised early iron slag"

(*ibid*, 284) and J.G.D. Clark regarded such an attribution as "probable" (1936, 216), recent opinion differs; Piggott, for instance, "regards the attribution with great suspicion (1973b, 401; and see also Alexander, 1981, 60), a view with which I would concur from examination of the material in Salisbury Museum (Sal. 38/36: the examination was, of necessity, purely visual but followed the guidelines set out by Bachmann (1982)).

Associations of iron and plain ware assemblages are likewise lacking, but this is hardly surprising in view of the paucity of plain ware material discussed above, and our current lack of understanding of, and failure to locate, early first millennium settlement in Wiltshire (*pace* Barrett and Bradley, 1980b, 199). All but one of the catalogue entries listed above come instead from contexts containing pottery belonging to Barrett's decorative assemblage - moreover, to the seemingly early phase within that tradition outlined above. The material from the double ditched promontory fort at Budbury, Bradford upon Avon, a site which, unlike those which follow, has the dual advantage of having been recently excavated and reliably published, should undoubtedly be so dated. Although one pottery fabric, Ware F, was found exclusively on the old land surface under the rampart (area III, layer 7) and two features (postholes 15 and 34) can be seen to predate the latter, the vessel classes and percentages from this earlier occupation and those from the occupation of the hillfort proper (i.e. from the box-rampart, berm, ditches and trapezoidal hut) are identical, leading Wainwright to conclude "that there is no basis for suggesting a hiatus between the two occupations" (Wainwright, 1970, 123). Indeed, the report treats all the listed finds - discussion of the Romano-British and post-Roman material from the superficial layers is omitted - as belonging

to a single phase of occupation; no restructuring of the rampart or ditches is visible in the sections, while all the finds from the interior derive from a single, undisturbed layer of clay (layer 3) resting on the bedrock.

The iron artefacts, which come from hut features, an area of buried soil on the rock surface of the berm and from rampart spill, include two complete and three fragmentary knives (the latter comprising a blade and two tang fragments, one set in an antler handle). One of the complete examples (Wainwright, 1970, fig. 17, 125) with curved blade and rectangular tang is similar to examples from All Cannings Cross and Cold Kitchen Hill (Cunnington, 1923, Pl. 20.11; D.M.C. (1934), XXXIII, 20) but the type is also to be found in late Iron Age and Roman contexts; the other, with riveted and slightly flanged tang and double-edged blade (Wainwright, 1970, fig. 17, 128), is unique in early Iron Age contexts. Pointed awls similar to that from Feature 14 of the hut likewise occur at All Cannings Cross, but their form (and that of the so-called angle-clamps - see Wainwright, 1967a, fig. 25) is too simple for chronologically valuable comparisons to be made.

Pottery occurs abundantly over the entire site and it is this that provides the clearest indication of the date of the occupation. In summary the assemblage consists largely (over 75%) of undecorated vessels of both coarse and fine ware: bipartite and straight-sided jars with simple rims, coarse bowls with rolled, thickened or beaded rims and others with slightly flaring rim, hollow neck and well-defined shoulder, fine bowls with a vertical neck above the shoulder, open pans with thickened or flat-topped rims and simple cups. Decorated forms comprise bipartite jars, haematite coated furrowed bowls (bipartite, short-necked) and bipartite bowls with sharp shoulders and simple or beaded rims,

the decoration being effected by the following means: finger-tipping and nail incisions beneath, on top of and along the outer edge of the rims and along the shoulders, rows of punched dots, circles, incised and stabbed geometric patterns along the shoulders, and incised, stamped and inlaid designs on the body of the vessels. Bases are flat and undecorated, omphaloid and footring forms being absent, and the assemblage contains only four cordoned haematite vessels out of a total of 1729 vessels.

It was observed above that over 75% of the ceramic assemblage consisted of undecorated vessels, the forms of which may mostly be found in such "plain ware" assemblages as Balksbury, Hants. (Wainwright, 1969) and Aldermaston, Berks. (Bradley *et al.*, 1980). The former comprises bipartite jars with simple flattened rims and rounded shoulders, bowls with upstanding or slightly everted rims and rounded or slack shoulders, small cups (Wainwright, 1969, fig. 14.7), plain open pans or bowls (14.9) and one example of a plain straight-sided jar (14.6); rims are simple, slightly beaded (14.3; 15, 13; 17, 46; 17, 54) or squared, while finger-tipping occurs but rarely, along the tops of rims, beneath lips and on shoulders. The latter comprises plain straight-sided and rounded jars, fine but undecorated bowls and plain open pans or bowls. To this basis has been added an increased use of finger-tip and nail decoration and the application of such decorative techniques as incision, punching, stamping, furrowing and the application of haematite coating to jars and bowls, traits which can be closely paralleled in other assemblages dating to the eighth-seventh centuries B.C. The forms of the vessels and the styles of decoration are to be found, for instance, amongst the material from Pit 5, Knight's Farm Berks, sub-site 1 (directly associated with the two radiocarbon dates cited earlier, Har

1011 and 1012) and likewise amongst the 1.7 assemblage from Rams Hill, Berks (Barrett, 1975, fig. 3.6, 34-72¹) both of which will be considered below. Thus while individual vessel types can be shown to occur in sixth century B.C., and later, contexts - open pans and bipartite bowls, for instance, are found amongst the phase I material at Gussage All Saints, associated with radiocarbon dates of 420 ± 90 b.c. (Q 1203), 450 ± 70 b.c. (Q 1209) and 570 ± 80 b.c. (Q 1204) (Wainwright, 1979, 3, 16) - consideration of the assemblage as a whole (of the prevailing vessel types, the modes of decoration and the virtual absence of developed haematite furrowed bowls or other later types such as round bodied bowls and slack shouldered plain coarse jars) suggests that the material from Budbury belongs to an early phase within the decorative tradition.

Some of the material from All Cannings Cross and Cold Kitchen Hill is undoubtedly as early, but while these two sites, excavated in the early decades of this century, yielded a prolific amount of potentially useful material, scrutiny of their respective reports (Cunnington, 1923; Nan Kivell, 1925-7) highlights the short-comings of the investigations and the accordingly unreliable nature of the evidence; in discussing these sites it is important that such shortcomings be demonstrated, thus preventing the evidence being accorded undeserved authenticity, as hitherto.

Though the report of the former appears at first glance to be exceedingly detailed, the finds largely illustrated, their positions and depths individually recorded, on closer reading it is virtually unworkable. While recognising that certain features cut one another

¹ This assemblage, incidentally, includes jars with finger-tip impressions below plain rims (65-67), a rare trait, and one that is also to be found at Budbury (6 and 10).

(posthole 36 cut by posthole 35, posthole 71 by 72), that some pits were dug into the subsoil and others into the overlying occupation debris (Cunnington, 1923, 62), and that there was a sequence of flooring in area V-W 16-17, Mrs. Cunnington failed to investigate the site's stratigraphy, merely recording that those finds which were not from the pits came from a single layer of black humus which seemingly both filled and sealed the features. From the published information, however, it is impossible to reconstruct a sequence of either vertical or horizontal stratigraphy for the site, many of the finds' dimensions having been omitted and, where available, being accurate only to within five square metres; some even lie outside the area reputed to have been excavated (Cunnington, 1923, Pl. 2, plan). Indeed, such an exercise of reconstruction merely suggests that the site had been considerably disturbed, probably by ploughing¹; sherds from the same vessel are found widely scattered over the site (vessel 29.1 was found in squares M5, L5, L6 and M6, while sherds from vessel 33.10 came from two separate and far-removed areas), the earliest sherds are stratified alongside haematite cordoned bowls and "smooth dark ware", while the iron swan's neck pin and one of the La Tène fibulae are stratified beneath the Armorican socketed axe, concentric ribbed button and notched tanged razor. Similarity in absolute depth should not therefore be taken to imply contemporaneity. Not only is it thus impossible to demonstrate associations between bronze and iron artefacts, but since none of these came from the pits, it is likewise impossible to point to associations between metal and pottery.

¹ It is even conceivable that the finds in the humus (which Mrs. Cunnington equates with rainwash off the higher downs behind) may relate to a site further up the slope.

It is true that some of the bronzes from the site date to the Ewart Park industrial tradition; the concentric ribbed button (Cunnington, 1923, pl. 18.9) is paralleled by examples from the Reach Fen, Cambs. (Inv. Arch. G.B. 17.3(3) 26-7), Kensington, Msex. (Inv. Arch. G.B. 52, 8) and Llangwyllog, Ang. hoards, from such Ewart Park settlement contexts as Runnymede Bridge, Egham (Longley, 1976, fig. 2(d); Needham and Longley, 1980, 405), and by an example from Casterley, Wilts., stratified residually (see below), while parallels for the notched tanged bifid razor (Cunnington, 1923, Pl. 20, 2) can also be found within that tradition (Feltwell Fen, Llangwyllog and Heathery Burn - though as we have already seen, this form has a long currency occurring also in Penard and Wilburton contexts). Tweezers likewise occur in Ewart Park contexts (Runnymede: ERB 76, 5; ERB 76, 53, 6; ERB 76, 79 and ERB 80.010, 25; Ivinghoe Beacon, Llangwyllog and Feltwell Fen), but none of these are collared as are those from All Cannings Cross, a feature suggestive of a Hallstatt C date on the basis of Continental comparisons (O'Connor, 1980, 221-2); furthermore, this simple form is to be found throughout the Iron Age and Roman period (Wainwright, 1967a, fig. 24; Kirk, 1949, fig. 7) thus precluding dating on purely typological grounds. The fragment of an Armorican socketed axe (Pl. 2), distinguishable by its narrow straight-sided blade section and the extension of the socket to the very end of the blade, may also date to the seventh century, for while some have been found in Carp's Tongue hoards here as on the Continent (Longy: Kendrick, 1928, Pl. VII; Briard, 1965, 275), the majority appear to date to Hallstatt C, possibly continuing into the La Tène period (O'Connor, 1980, 236); most of the British contexts are not helpful, the axes occurring as stray finds or unassociated with other

types (Dunning, 1959), but a recently discovered example, that from the hoard from Danebury, Hants., was associated with two Hallstatt C razors (Cunliffe and O'Connor, 1979; fig. 12; 1.6 and 1.7) and two Sompting axes (*ibid.* fig. 12; 2.8 and 2.9). However, not only are there no secure grounds for associating any of the ironwork with this material but it must also be noted that both the bronzes and the pottery span a few centuries - the ^{material} ~~bronzes~~ includes an iron swan's neck pin probably to be dated in the early 6th century B.C., La Tène I fibulae (Pl. 18; 12 and 13), ring-headed pins and a bronze penannular brooch of Fowler's type B, while the pottery includes a coarse "Deverel-Rimbury derived" jar (Cunnington, 1923, Pl. 48a.I) with finger-impressed decoration below the rim and around the shoulder, vessels belonging to our early decorative tradition, haematite coated cordoned bowls with decoration incised after baking and smooth dark ware; the ironwork may accordingly date anywhere within this span. Nor are typological comparisons for the latter helpful; similar knives, for instance, may be found at Budbury in a context which has been argued to be early, but identical tools continue in use into the late Iron Age (Wainwright, 1967a, figs. 28, 30) while similar gouges and pins are found in late Iron Age and Romano-British contexts.

The range of material from the complex at Cold Kitchen Hill is even more various, ranging from the Later Bronze Age to the Roman period, but as mentioned in the foregoing catalogue, our only records consist of lists of unstratified material; here, too, it is impossible to assign an early date to the ironwork, despite the presence of early 1st millennium pottery ("Deverel-Rimbury derived" coarse wares and sherds of early decorated material) and of a tanged flanged knife

(C.K.H. 1063), the best parallels for which come from the Grays Thurrock, Essex, and Yattendon, Berks, hoards (Butcher, 1922; Burgess, Coombs and Davies, 1972, fig. 18.53) there associated with Carp's Tongue material. The hollow bossed bracelet (W.A.M. xlv, 141-2) found on the surface of the site in 1927, while belonging to a class of relief decorated bracelets which date from Late Urnfield to La Tène on the continent (Peroni, 1973, fig. 4.7; 7.11; Freidin, 1982; Briard, 1965, 275), is paralleled most closely by an example from a hoard at St. Bagan containing Armorican socketed axes and associated with charcoal which gave a radiocarbon determination of 570 ± 110 b.c. (GsY 42), and by two examples from Hallstatt D contexts at Le Rocher, Morbihan and La Cambe, Calvados; the closest British parallel is that from Potterne, Wilts. (D.M.76.1981.5) but its associated artefacts, a bronze spiral-twisted torc and square-sectioned awl, do not help to determine the date more precisely. A Late Bronze Age - Early Iron Age date cannot even be conclusively proved for the iron looped socketed axe found in 1925; of the examples known from the British Isles (Manning and Saunders, 1972, 283-8), only two were securely stratified, those from Traprain, West Lothian and Camolodunum, Essex, the latter dating to the 1st century A.D., and while it has been shown that the manufacture of these artefacts laboriously copies that of their bronze counterparts, this is thought by Manning and Saunders to indicate a mature art rather than one in its infancy (*ibid*, 280), a viewpoint which perhaps finds confirmation in the unusually extravagant amount of iron used in the manufacture of this axe (for the comparative sizes of the Armorican and iron axes see Pl. 2).

Oliver's Camp, Bromham has been but briefly described in the catalogue, as the evidence from this site is even more tenuous than that

of the preceding two examples. While it is clear that sherds of finger-impressed and bipartite haematite coated furrowed bowls were stratified in early contexts throughout the site, probably relating to an unenclosed phase in the settlement's history - in the primary silting of the V-shaped ditch prior to its recutting, on the old land surface under the original rampart at section C¹ and at the entrance, and possibly from the hearths under the rampart at sections A and B, and in the interior (though these sherds are very abraded and nondescript) - and furthermore, that the iron staple from the ditch to the north of the entrance was associated with Romano-British material and can hence be discounted, it is however difficult to determine the date and context of the iron knife shown in figure 3k.. This was found on the turf surface of the first rampart in section C, a horizon which in this area contained merely a single and very fragmentary rounded base of indeterminate Iron Age date and elsewhere is devoid of finds. Indeed, no diagnostic finds come from the body of the original rampart, while the enlargement contains Roman material, and hence it is impossible to assign a date to the construction of the defences; it may, however, still be possible to associate the knife with the date of the unenclosed phase described above, for as Alcock has recently pointed out (1980, 695), material on the tail of a rampart will include both that scraped up from an earlier occupation and that later than the construction, but contemporary with the use, of the defences - but such a supposition, made on the basis

¹ Some clarification of the context of the haematite coated rim sherd found in section C is required as it has been suggested (D.M.C. forthcoming) that this may not relate to the first rampart but to its enlargement. Scrutiny of Mrs. Cunnington's report (p. 433) indicates that the sherd can only have lain on the old land surface beneath the original rampart as its depth is deliberately taken from below the turf (i.e. "the dark seam") rather than "from the surface" as in the case of the preceding three finds.

of a handful of sherds and a report with several crucial lacunae, should not be accorded too much importance, hence my hesitation over including the site in the primary catalogue.

Iron artefacts and slag are reputed to have been found in several locations in the enclosure at Lidbury, but here again interpretation is hampered by the inadequacies of the report, of which the ambiguous and eclectic nature of the finds' recording is the most serious problem; material attributed to particular pits (according to records in Devizes Museum) is omitted from the list in the primary catalogue, while it is impossible to assign such finds as the bronze fibula and fragment of sheet bronze to their rightful contexts as the report merely states that they came "from the outer ditch west of the entrance" (Cunnington, 1917, 24), failing to specify whether they lay to the west or east of section O-O, the point at which the two ditches intersect. Some of the iron from the site may be discounted, either because it was misidentified by Mrs. Cunnington (as in the case of the so-called "slag" in the earlier, "supernumary", ditch east of the entrance, which is merely an iron-enriched stone) or because it was associated with later material (as in the case of that from surface trenching in the interior or that from Pit I, found with a decorated cordoned haematite sherd, D.M. 2410, and a bowl of fine black ware with zig-zag decoration incised after baking), but an early date may perhaps be proposed for the socket fragment found at the base of the main enclosure ditch. While Late Iron Age and Roman finds were stratified in the upper 1.22 m. or so of this ditch, the lower levels yielded a considerable quantity of bipartite jars with simple rims and round shoulders, decorated with finger-tipping beneath the rims and on the shoulders, and finger-nail decoration along the top of the rims, together with haematite coated furrowed bowls,

and these, unlike the identical vessels from the pits, were not associated with later vessels. Indeed, none of the other artefacts reported as having come from the lower strata of the main ditch or indeed from the earlier, "supernumary", ditch which runs for part of its length under the rampart (and which also yielded haematite sherds) would contradict such a date for the initial enclosing of the site, comprising as they do nondescript bone artefacts, fragments of Kimmeridge shale bracelets and what may tentatively be identified as a perforated clay slab of the type which will later be discussed (having been found on Late Bronze Age-Early Iron Age sites in South-Eastern England)- though this is purely on the basis of the published description and not on first-hand examination.

Barrett and Bradley have recently observed that early pottery is to be found at the site of Casterley Camp, Upavon (1980b, 201) a twenty-five hectare enclosure two miles south-west of Upavon, excavated by the Cunningtons between 1909 and 1912. Three stages in the settlement's history are discernible: an unenclosed phase represented by three pits which yielded coarse finger-tip and nail decorated jars and perforated bone buttons similar to those from All Cannings Cross and Cold Kitchen Hill, a phase in which a rectilinear earthwork associated with inner earthworks and an enclosing rampart and ditch were constructed, bead-rim bowls being stratified in primary contexts in each case, and a phase of Romano-British occupation occurring when the inner enclosure ditches had silted up and the main defences were obsolete. The site does not, however, merit inclusion in the primary catalogue as the iron artefacts cannot be shown to have been associated with the early pottery; that from Pit 2 is related to the Romano-British inhumations cut into the top of the feature, while the slag and hammerhead came

from "inner ditch 8a", which is clearly contemporary with the complex of ditches, numbers 1 to 8, at the base of which lay numerous fragments of bead-rim bowls.

The site of Winklebury has likewise been omitted from the primary catalogue because of the tenuous nature of the evidence. Iron slag (here correctly identified) was found on the old land surface under the rampart on the north side of the enclosure (section III) and while not directly associated with pottery, sherds of putative decorated assemblage vessels do occur in a similar context in sections I and II; however, such an identification is based purely on published descriptions and may be erroneous. The six hectare enclosure at Figsbury Rings, Winterbourne Dauntsey, has also been relegated to the secondary catalogue for though similarly early pottery is to be found in primary contexts in the outer defences - a date perhaps confirmed by the Ewart Park sword ploughed up in the interior of the site in 1704 - the material termed "slag" from "Firehole I" beneath the south-west rampart has clearly been misidentified by Mrs. Cunnington. Another tantalising site which, though yielding potentially valuable evidence, had to be omitted from the main catalogue because of inadequacies in its report which prevented contexts containing early material (simple rimmed bowls and jars, some with finger-tipping along the top of, and beneath, the rim, others with haematite coating and furrowing) being distinguished from those containing bead-rimmed and Gallo-Belgic vessels, is that of Highfield, Fisherton; two fragments of iron were found in the pits, while traces of the metal are still clearly visible on the bone hafts of some tools (and also, according to Stevens, 1932-4, 586, on some flint implements - though this I was unable to verify).

Three further associations demand brief mention though their unreliability precluded their inclusion in the primary catalogue. The first consists of an iron knife fragment set in an antler handle, found by workmen "eighteen inches below the surface" while preparing the foundations of the new wing of Marlborough College in 1897, seemingly associated with burnt material, animal bones and sherds of five coarse flint and chalk gritted vessels with flat-topped, slightly everted rims decorated with incisions or pie-crusting and with finger-tip decoration around the neck; one of the vessels was reconstructed as having an incised neck cordon, its bulbous body decorated with horizontal zones of zig-zag and dashed incised lines. The second is that of an iron knife found with an inhumation in Barrow 3 of the Collingbourne Ducis complex (Lukis, 1866-67); pottery scattered by the plough around the barrow, but thought to have been associated with the burial, includes a finger-tipped rim and putative lug-handles compared by Hawkes and Dunning (1932, 420-1) to All Cannings Cross coarse wares (an odd attribution in view of the bucket, biconical and collared urn material from the surrounding barrows). However, as I have been unable to inspect the material from these two locations, and in view of the antiquity and manner of their discovery and publication - in neither case is the latter sufficiently detailed to permit certain re-identification - it would seem wise to discount them. The finding of the tip of an iron awl associated with material which includes sherds with finger-tip decorated cordons and finger-impressed, incised and inlaid decoration (D.M. 2294-2355) from an area midway between Martinsell hillfort, Pewsey and the Giant's Grave promontory fort (and possibly associated with the latter) must likewise be discounted; the finds were merely recovered as a surface collection, examination of which indicated that cordoned haematite material was also included.

Such doubtful sites have nevertheless been included in List 2 and plotted on Map 2, together with those which, though lacking iron artefacts or slag, have yielded early decorated ware. The occurrence of such pottery in primary contexts on settlements in Wiltshire, following a dearth of occupation evidence dating to the earlier first millennium has been noted by Barrett and Bradley, who listed several such sites and discussed the implications of this seeming resurgence of settlement in their joint paper of 1980. Consideration of the latter aspect will be deferred until the discussion section; here I wish merely to illustrate, and add to, their list, following my examination of artefacts and records in Devizes Museum.

Apart from those sites discussed above, they listed the occurrence of early material at Longbridge Deverill Cow Down (28), Broadbury Banks (here attributed to South-West Upavon Aerodrome: 41), Liddington (27) and Battlesbury (1); pottery from the latter site is similar to that, not listed by Barrett and Bradley, from Potterne (a putative promontory enclosure, the defences of which may have been incorporated into a modern field boundary: pers. comm. P. Robinson) West Wick Farm (35) and Upton Cow Down (47). Not only is most of the pottery from these settlements stratified in primary contexts, testifying to the establishment of new sites at this period, but in eight instances it is stratified beneath hillfort defences; the examples of Battlesbury, Lidbury, Casterley, Figsbury, Winklebury and Oliver's Camp have been cited already and to those may be added Liddington - sherds found in 1975 were thought to derive from the old land surface beneath the inner bank of this ditched and double-banked enclosure - and perhaps also Chisenbury Trench (35). The remaining sites detailed in List 2 have been culled from Grinsell's gazetteer in the Victoria County History for Wiltshire; that

material which I was unable to examine owing to its being held in private collections, and of whose authenticity I am consequently unsure, is listed in parentheses.

Great importance has been placed on the putative association of iron spearheads and bronze weapons from Melksham, but this, to my mind, is undeserved. Gingell's reasons for regarding the object as a hoard (1979, 248) are questionable; his observations, for instance, that the objects display a similar patina and that some contain river gravel in their sockets may indicate that they derive from a riverine location but tell us nothing about the relationship of the finds to one another. When it is observed that the artefacts were found amongst spoil from a mechanical excavator which was stripping an area of over one thousand square metres - a riverine area moreover - it would seem prudent to question the integrity of the "hoard". The finds, which consist entirely of martial equipment (and can hence be regarded as votive deposits rather than eroding settlement débris, *pace* Needham and Burgess, 1980) may derive from a series of isolated incidents, only later being artificially conflated into an "assemblage". The foregoing may sound unduly critical, indeed ridiculous, but I think it is salutary to scrutinise contexts such as this; if we are to construct our sequences upon such chronological niceties as hoard associations then we must ensure that our building blocks are reliable. It is highly regrettable that in the field of study under discussion the three of the known "hoard associations" should be so dubious.

Even discounting the appellation "hoard", these artefacts are worth considering. One of the three pegged socketed spearheads with leaf-shaped blade (D.M.9.1972) is reputed to have contained an iron peg in its socket (lost prior to analysis), a phenomenon known in only

three other instances. In the case of the pegged leaf-shaped spearhead in the Ewart Park hoard from Gilmonby, Co. Durham (see below, page 264), it would appear that the effect was illusory, caused by iron pan leaching from the surrounding soil, whilst the rivet from the triangular-bladed basal-looped spearhead from Wilcot, Wilts. (D.M. 1104), again identified purely visually, was regrettably lost during conservation prior to analysis; only that from the pegged spearhead from the Thames at Hampton Court (Lawrence, 1929; Mus. Lond. A 27215) proved to be iron (X-ray 0202; spot test; App. II) but this unfortunately was simply a single find. The type, moreover, has a long currency, from Penard to Late Ewart Park, and as decoration on the sockets appeared as early as the Wilburton phase it is difficult on typological grounds alone to assign the weapons to a particular industrial tradition; if the prudent attitude of regarding these spearheads as unassociated with the remainder of the finds is adopted, then the only indication of their date is provided by their size, less than fifteen centimetres long, dimensions similar to those current in the Ewart Park phase, those of the earlier traditions tending to be longer (between twenty and thirty centimetres).

The two iron spearheads also have leaf-shaped blades, the larger with lozenge-shaped midrib and grooved linear designs on blade and socket, the latter pegged and terminating in a collar formed from a grooved iron ring (a technique also used in forming the socket end of the iron sickle from Llyn Fawr), the smaller, lacking decoration, midrib, and peg-holes (though admittedly the socket is broken above the point where the latter might be expected to occur), with lozenge-sectioned blade and thick socket. Iron leaf-shaped spearheads occur in Western Europe from Hallstatt B3 onwards (Kimmig, 1964, 276-7) becoming

common in Hallstatt C2 (Kossack, 1959, 94) and continuing into La Tène; while it has been customary to compare the example from Llyn Fawr, Glam. to a similar, though somewhat larger and unpegged, example from Court St. Etienne Barrow 3 (Marien, 1958, 108-28, esp. 121; fig. 18, 209) this should not obscure the fact that examples both with and without midribs are to be found in Hallstatt C1 contexts in Western Europe, such as that from the secondary burial at La Tombe Fourdaine, Pas de Calais (Gaucher and Mohen, 1974, 75, fig. 48; Freidin, 1982; and see also Kossack, 1959, Kombinationsgruppen AIII. 1 and 2, esp. Taf 117.11 and Taf. 95.21). Gingell has observed that while ornamented spearheads occur in Hallstatt C contexts in Switzerland, it is not necessary to look so far afield for the inspiration for the decoration (Gingell, 1979, 249) and that, as in the case of the socket mouth, perhaps here too local experimentation could be invoked; sockets decorated with bands of lines appear during the Wilburton phase (e.g. the Watford, Grays Thurrock and Minnis Bay hoards, and the contemporary practice in Northern England, Northern Ireland and Scotland of decorating spearheads with applied strips of gold; Coles, 1971; note also the French Bronze Final III equivalents: Gaucher and Mohen, 1974, ill. 41, Dépôt d' Amiens; Mohen, 1977, Essonne 636, 639), while the blades and midribs of some Broadward spearheads are likewise decorated with hatched and linear designs. If the possibility of local experiment is allowed, then the difficulties of assigning dates to these artefacts is clear; a Hallstatt C date is both attractive and conceivable, but cannot be conclusively demonstrated. As for the date of the three "phalerae", bronze discs with central boss surrounded by concentric ribbing and turned rim, reputedly found with the remainder of the artefacts but only recently presented to Devizes Museum, little can be

surmised at present; the only illustration currently available shows merely the upper face of one example and lacks a scale, thus prohibiting attribution to either the Late Urnfield or the Hallstatt C class as discussed by O'Connor (1975); though requested, further information about these three finds was not forthcoming.

Though discussion of the earliest iron from Wiltshire has proved difficult owing to the inadequacies inherent in most of the excavations and reports from which the evidence derives, it has nevertheless been possible to demonstrate - I hope convincingly - that iron artefacts were in use in Wiltshire during the eighth and seventh centuries B.C. contemporary with the occurrence of a range of decorated jars and bowls. Meagre though the total evidence may be compared to that from such sixth and fifth century sites as Swallowcliffe, Fifield Down and Yarnbury, the socio-economic implications of the occurrence of iron at this horizon are significant, as will later be discussed.

DORSET AND HAMPSHIRE

The later prehistory of Dorset and Hampshire, treated here as a single region on ceramic grounds, has been as intensively studied - and the history of such research as frequently documented - as that of Wiltshire considered above. Prior to 1920 little work of relevance to the present study was carried out in this area (with the exception of Bush-Fox's campaigns at Hengistbury Head between 1911 and 1912; Bush-Fox, 1915), but the following two decades saw a spate of excavations on defended settlements - those of Hawkes, Myres and Stevens at St Catharine's Hill from 1925-1928 (Hawkes, 1930), Wheeler at Maiden Castle from 1934 to 1938 (Wheeler, 1943), Liddell at Meon Hill in 1932 and 1933 (Liddell, 1933; 1935), the Hawkeses at Bury Hill and Barksbury in 1939 (Hawkes, C.F.C., 1940; Hawkes, J., 1940) and Whitley at Chalbury in that same year (Whitley, 1943). Unlike Wiltshire, however, where comparatively little work was carried out following the Cunningtons' researches, Iron Age archaeology in this area continued to flourish - advances in techniques of surveying, excavation and recording pioneered in the 60's (Harding and Blake, 1963; Cunliffe *et al.*, 1968) have been further refined in a recent series of large scale excavations at such multi-period sites as Ructstalls Hill, Winklebury, Cowdery's Down and Old Down, Hants. - with the consequence that much of the evidence discussed below is more reliable than that contained in the previous section, and its interpretation less constrained by limitations inherent in the retrieval methods.

As the ceramic sequence of this region is identical to that for Wiltshire outlined above, only a summary description need here be given. While numerous unmixed assemblages of plain ware are attested - as scatters from Pimperne Down, Dorset (Barrett, 1980, 309), Warsash,

Hants. (Barrett, 1975, 105), Romsey, Hants. (Barrett, 1975, 103), Portsmouth and Langstone Harbours, Hants. (Bradley and Hooper, 1974) and Sheepsleights, Worth Matravers, Dorset (Calkin, 1948, 30-2, fig. 4), associated with a linear bank system as at Eggardon, Askerwell, Dorset (Wells, 1978, 66, fig. 21, nos. 16 and 20), and with occupation traces as at Old Down, Andover, Hants. (Davies, 1981, fig. 10) or at Barksbury, Hants. (Hawkes, J., 1940, 338-45; Wainwright, 1969) - sherds of this tradition also occur associated with Deverel Rimbury pottery as at Winnall Down, Hants. (Barrett and Bradley, 1980b, 199) or Eldon's Seat, Dorset (Cunliffe and Phillipson, 1968). In the case of the latter site, the material in question is associated with an open settlement, built against the lower slope of a lynchet, comprising circular huts, possible palisades, hearths and areas of paving; although numerous reconstructions occurred during this, the earliest, phase (labelled A1) - indeed, the text barely does credit to the apparent stratigraphic intricacies¹ - these would appear to have occurred within a sufficiently short period as to allow the pottery shown in figures 10 to 12 in the report to be treated as a unitary group as proposed in the text (Cunliffe and Phillipson, 1968, 208).

None of these assemblages were directly associated with chronologically helpful artefact types, nor have radiocarbon dates been elicited from their contexts - with the exception of an anomalous date of 90 ± 70 b.c. (Har 3495) from animal bone from Pit 937 at Old Down and a further determination of 790 ± 170 b.c. (Har 442) from Barksbury, Hants. - and thus their dating depends upon comparison with material from

¹ To take but one example; if postholes 163 and 168 do indeed indicate a fence-line as Cunliffe suggests (fig. 4), might this not have enclosed an earlier dwelling than Hut 1, the hearth of which cuts these features?

neighbouring regions. While material from Southern Wessex has traditionally been linked with that of Sussex (Cunliffe's Kimmeridge-Caburn group, for example), consideration of both forms and contexts suggests that the strongest cultural links are with Wiltshire, and thus it is proposed that the plain ware of Dorset and Hampshire be accorded the same chronology as that outlined above for Wiltshire. Only the evidence from the post-built roundhouse at Pimperne Down, Dorset, fails to conform to that scheme; sherds of slab-built finger-streaked jars would seem to be stratigraphically inseparable from decorated wares stemming from contexts which have yielded radiocarbon determinations in the sixth and fifth centuries b.c. - but it would be unwise to suggest an extended currency for the tradition on these grounds alone, and prior to the site's final publication¹.

The dating of the advent and currency of the decorative tradition in this region similarly relies to a large extent on external comparisons, in the absence of helpful artefactual associations, stratigraphic relations and relevant radiocarbon dates, the only examples of the latter being those from the plateau fort at Winklebury, Hants. and from the enclosure at Old Down, Hants. In the case of the former site (Smith, 1977), the relationship of the sample - a determination of 250 ± 60 b.c. (Har 1764) derived from charcoal from a porch post belonging to the postbuilt roundhouse structure 3870 - to the decorative pottery it purports to date

¹ It is unfortunately not possible to point to a putative early phase of construction within the house by plotting the distribution of the early ceramic material, owing to ambiguities in the finds' recording techniques used on site - though this procedure was tried; certain postholes in the north-western area of the site (squares B3 and C3) may belong to such a construction, the remainder of which has been destroyed owing to its location downslope and beneath the main functional area of the later buildings. (I thank Professor D.W. Harding for allowing me ready access to the site's documentation.)

is tenuous; though structure 3870 is attributed to phase 1 of the settlement's history on ceramic grounds, the report fails to illustrate or even describe any of that material, save for one sherd of furrowed bowl from posthole 3587 (fig. 31, no. 28). It would be foolhardy to propose an extended currency for the entire decorative tradition on the basis of a single date, badly associated with but one aspect of that ceramic assemblage. In the case of the latter, doubt has been cast (Clark in Davies, 1981, 144-5) on the reliability of the determination elicited from animal bone from Pit 1080, the cause of the anomaly being either stratigraphic or, more likely, technical.

Such lacunae hamper the establishment of a sequence of development within the area, and that which follows must therefore be regarded purely as a tentative scheme pending the retrieval of further crucial information. By means of comparison with Wiltshire, an eighth century B.C. date may be suggested for the advent of assemblages dominated by coarse shouldered jars decorated with finger-nail stabs, piecrust rims or cuts on shoulders, on and below rims and on pulled-out bases, fine ovoid jars decorated with haematite coating, stamped circles, incised geometric patterns, slashed linear decoration, stabbed and impressed dots and geometric patterns (such as triangles or chevrons) often infilled with white paste, and bipartite bowls decorated in similar manner; such vessels are found most abundantly at Bindon, Dorset (Wheeler, 1953), Gallows Gore, Langton Matravers, Dorset (Calkin and Piggott, 1938; Calkin, 1948), Hengistbury Head, Hants. (Bushe-Fox, 1915), Kimmeridge, Dorset (Calkin, 1948, 37-40, Upper Iron Age level), Sheepsleights, Worth Matravers, Dorset (Calkin, 1948)¹, Old Down,

¹ The class II notch tanged razor cannot be associated with the pottery from the Swanworth quarry site as it was not found under archaeological conditions, and thus is not an aid to dating the tradition.

Hants. (Davies, 1981), Cowdery's Down, Hants. (Millet, 1980a,b; 1981) and Winklebury, Hants. (Smith, 1977). As in that county, moreover, these decorative assemblages appear to be related to altered patterns of settlement, since most are associated with the primary occupation, or else the initial defence, of the settlements on which they occur. At Winklebury sherds of such vessels were retrieved from the old land surface under the primary rampart of the hillfort (Piggott, 1940) while at Bindon similar wares were associated with the construction of the cross-dykes; though the evidence from Danebury, Hants. has not yet been published in full, it would appear that here, too, such pottery was associated with the earliest settlement within the hillfort (Cunliffe, 1971b, 24; and O'Connor, 1979, 242) comprising rows of four-post structures perhaps set within a palisaded enclosure. At the open settlement of Cowdery's Down, Basingstoke (Millet, 1980a and b; 1981), coarse bipartite and tripartite jars decorated with geometric patterns or finger-tip and nail impressions along and under the rims, around the base and on the shoulders were associated with a postbuilt roundhouse and two ring-ditches, the first major structural traces on the site, and similar associations occurred at Barton Field, Tarrant Hinton, Dorset, Old Down Farm, Andover, Hants. and at the ten and a half hectare ditched and banked enclosure at Hog Cliff Hill, Dorset, in the latter instance with posthole wallslot houses (P.P.S. 1960, 345; 1961, 347; Rahtz, 1960, 83)¹.

While individual elements both of decoration (the use of stamping, furrowing, incision and haematite coating) and of form are to be found in

¹It should be noted that such pottery, although occurring in stray contexts across the entire site, cannot be associated with the construction of the first phase of defences (a timber-framed box rampart) at the hillfort on Hod Hill.

assemblages of the sixth century and later, the demise of the decorative tradition is here defined as occurring with the cessation of the dominance of coarse jars and bipartite bowls exhibiting a lavish use of incision and finger-printing, and the appearance of assemblages comprising a range of largely undecorated vessels - ovoid jars with high slack shoulders and upright rims, coarse globular jars, shallow open bowls with thickened rims, haematite furrowed bowls with pronounced shoulders and flaring necks and carinated bowls with tall concave necks. Determining the date at which this transition occurred, however, is not an easy task, despite the fact that a series of tightly grouped radiocarbon dates have been derived from material closely associated with such assemblages, those from Pimperne Down, Dorset (Harding, forthcoming) and Gussage All Saints, Dorset (Wainwright, 1979). Charcoal and bone from the Phase I ditch and from contemporary pits within the three acre enclosure at Gussage - features which yielded coarse thick-walled shouldered jars, both fine and coarse round-shouldered bowls, globular bowls and jars, haematite coated bowls with pronounced shoulders and straight-sided or slightly everted rims and shallow straight-sided dishes, all but four sherds of which were plain - produced the following three dates, 420 ± 90 b.c. (Q 1203), 570 ± 80 b.c. (Q 1204) and 450 ± 75 b.c. (Q 1209), while pottery from the postbuilt roundhouse within the ditched enclosure on Pimperne Down, another predominantly plain assemblage (approx. 77%) comprising high-shouldered or ovoid jars, carinated bowls in a variety of forms with upstanding or slightly out-turned rims generally coated with haematite, furrowed bowls with tall concave necks, round-bodied bowls and open shallow bowls, can be linked with the following five dates derived from charcoal from postholes and a pit belonging to that structure:

PD 61	1	485 ± 65 b.c.	(GU 1579)
PD 61	2	430 ± 65 b.c.	(GU 1577)
PD 61	3	540 ± 65 b.c.	(GU 1576)
PD 61	4	405 ± 65 b.c.	(GU 1578)
PD 61	5	570 ± 65 b.c.	(GU 1575)

While the close agreement between the two sets of dates is indeed attractive, their value in determining the advent of this new, plainer tradition is minimal, for after calibration (using either Clark's curve or that of Ralph *et al.*, 1973) their range can be seen to stretch from the ninth to the fifth centuries B.C. (Wainwright and Switsur, 1976, 35).

Nor can finer chronological precision be gained from artefactual associations, for though numerous sites contain similar ceramic assemblages (comprising open pans with flat-topped rims, large ovoid jars with upstanding or outbent rims, coarse jars in various forms generally lacking decoration, globular jars with everted rims, haematite coated bowls with vertical sides above the shoulders or else with rounded shoulders and flaring rims, and carinated bowls with upstanding or out-turned rims) - sites such as Eldon's Seat, Chalbury, Langton Matravers (Pit 8), Corfe Mullen, Quarry Lodden and Hengistbury Head - only a single piece of metalwork has been derived from such contexts, namely a tanged chisel with flaring triangular blade from the enclosure at Eldon's Seat, Encombe. Sadly, however, even this does not constitute a secure association, deriving as it did from Trench F, an area of the site in which it was often difficult to distinguish between layers of the two periods (i.e. Period I, the primary occupation of the site and Period II, that following the build-up of the North-South lynchet), and more particularly from Layer 2 therein, a level containing sherds of both the plain ware and "post-decorative" traditions. In view of the uncertainty surrounding the association, it is clearly unwise to

derive a date for the latter ceramic tradition from this evidence - as Longley has recently attempted (1980, 73). That author's means of supporting such a shaky argument, moreover, are equally dubious, for having pointed out certain similarities between vessels from Eldon's Seat Phase II and All Cannings Cross, he extrapolates a date for both assemblages from the earliest metalwork on the latter site, failing to observe that the relevant pottery therein belongs to a later phase than the metalwork.

It is thus impossible at present to date the advent of the "post-decorative" tradition more precisely than to within the four century span suggested by the radiocarbon dates; any finer definition would be spurious. Nor can stratigraphic evidence be cited to prove conclusively that such ceramic assemblages follow those of the decorative tradition, for though mixed assemblages occur (Hengistbury Head; Eldon's Seat), the two groups have not yet been found in sequential layers on the same site¹. In view of this lack of essential evidence it is proposed that only sites which contain iron in association with pottery of the decorative tradition be considered here, those assemblages being seen as dating to the eighth and seventh centuries B.C. by comparison with Wiltshire, as argued above.

¹ Formal analysis, however, suggests that the application of the term "post-decorative" to such a tradition is appropriate (viz. Cunliffe and Phillipson, 1968, 235-6).

PRIMARY CATALOGUE

BINDON HILL, Lulworth, Dorset

SY 835 802

Univallate promontory fort, originally 160 ha in extent with timber revetted rampart. Four week trial excavation in 1950 restricted to northern entrance, the defences surrounding it and the unfinished cross-bank; the interior was not examined archaeologically, but a series of trenches cut for military purposes along the ridge failed to reveal any signs of Iron Age occupation. A large assemblage of decorative tradition pottery - round-shouldered jars and bipartite bowls profusely decorated with finger-tipping or incision on the shoulders and along, below or on the outside of the rims, some with slightly projecting bases - were recovered from in and beneath the bank, and from both in and under the turf line between the front and rear revetment palisades in the principal cutting across the defences (BIN₂). The sole metal artefacts comprised "an inchoate scrap of iron" and two fragments of a segmental-sectioned bronze bracelet (unprovenanced).

Bibl.: P.D.N.H.A.S. vol. 72 (1950) 80-2
Wheeler, 1953.

Mus.: Dorset County Museum, 1972.122. (Bracelet fragment: missing and no mention of iron in the register of accessions. November 1981.)

CHALBURY, Dorset

SY 695.838

Univallate pear-shaped contour fort of 4 ha situated on a high knoll at the north end of the Rimbury ridge, a southern spur of the Dorset Downs. A single season of excavation was carried out here in the summer of 1939 comprising two cuttings through the defences, one on the trackway at the south-western corner of the fort and four within

the interior. A large ceramic assemblage, discussed in the text, was derived from three principal locations: from the pre-rampart layer on Site C, from the wooden hut on Site A and from the stone hut on Site D. Small finds include two bone gouges, a limestone spindle-whorl, flint artefacts, part of a saddle-quern, an annular blue bead, part of a bronze binding, bronze rivets, a fragment of a bronze bracelet, a bronze ring and a single-edged tanged iron knife. (The soil was inimical to the preservation of the latter metal.) Whitley's interpretation of the phasing of the site is dubious, as discussed below.

Bibl.: Whitley, 1943.

Mus.: Dorset County Museum.

WINKLEBURY, Basingstoke, Hampshire

SU 613 529

Univallate plateau fort of 7.6 ha occupying a hill of Upper Chalk on the southern edge of the Lower Thames Valley, 1.6 km north-west of the centre of Basingstoke. The site has been under plough since 1831 so many shallow features have disappeared and others have been truncated. The defences of the site were examined in 1959 by Robertson-Mackay in advance of redevelopment on the northern side of the fort, while a rectangular area two hundred and twenty metres long by one hundred metres wide in the west of the fort running from the tail of the north rampart to within twenty metres of the tail of the southern rampart was stripped in 1975-76, again in advance of redevelopment. The former excavations revealed two phases of defences, the first, that which is of concern here, consisting of a timber-revetted rampart with square-profiled ditch and associated with pottery of the decorative tradition. The recent excavations in the interior

(which sadly cannot be linked stratigraphically with the earlier findings) revealed pits, postholes, gullies, stake-holes and working hollows; on the basis of the ceramic evidence, two phases of occupation were distinguished, phase I being represented by post-built circular and quadrangular structures (six double or single ring post-built houses with external porches and double posts flanking the entrance, and forty-two "four-posters") and three pits (Pits 1399, 3660 and 3916). Two radiocarbon dates were elicited from material belonging to Phase I:

Har 1764 250 ± 60 b.c. (charcoal from charred porch
post from structure 3870)

Har 1765 20 ± 70 b.c. (charcoal from Pit 3660 context
3643; sample thought to be
contaminated by roots)

The pottery from Phase I is discussed in the text, as is the industrial evidence stemming from a Phase I pit and a contemporary pit; no small finds are listed as all derive from the second phase which is of no concern here.

Bibl.: P.H.F.C. vol. XV, pt. 1 (1940), 56-7.
Robertson-Mackay, 1960; 1977.
Smith, 1977.

DISCUSSION

The paucity of evidence for the use of iron in the eighth and seventh centuries B.C. in Dorset and Hampshire is evident in the foregoing catalogue, and even such a scanty list could be further reduced if the strictest criteria for including data in the primary catalogue were upheld. At Bindon Hill, a site which produced a

large assemblage of pottery belonging exclusively to the decorative tradition - coarse round-shouldered jars and bipartite bowls heavily decorated with finger-tipping and impressions below, along and on the outer edges of rims, and on carinations - the evidence consists of an "inchoate" scrap of iron, a find which, together with a fragmentary bronze bracelet, the report fails to locate or illustrate. In the absence of specific contextual information it may be inferred that such metalwork was associated with, and can be dated by, the pottery described above; on this rather tenuous assumption rests the site's inclusion here. Chalbury likewise ought perhaps to be relegated to the secondary catalogue, on the grounds that the evidence is too tenuous, as close scrutiny of the report reveals. Two problems arise in attempting to assign a date to the iron knife from Layer 17 of the enclosure's main ditch, the first being that of ascertaining when the primary defences were constructed. Scarcely any ceramic material can be shown to be contemporary with this event, that from the quarry ditch on Site A and from Site D being stratigraphically unrelated to the ramparts, and that from Site C (Deverel Rimbury and plain ware sherds) predating their construction; one sherd only was found in the rapid silt of the main ditch (Site A, layer 18; fig. 4, no. 16), a flat-topped haematite rim either from a necked vessel similar to those found at the second phase of Eldon's Seat or from a decorative tradition bowl. Secondly, despite the fact that the iron knife lay in the layer immediately above this, there is some confusion in the report as to which phase this belongs to. Whitley proposed two phases of rampart construction, a primary stone-revetted earthen rampart later refurbished and heightened by the addition of limestone rubble and a rear retaining kerb - but failed to apply such a sequence to the ditch.

More recently, however, a reworking of the latter's phasing has been suggested (Avery, 1979; site catalogue) with a deep narrow ditch being envisaged as being recut to a wider, shallower form, thus raising the possibility that the knife may have belonged to the second episode (which involved the levelling of the limestone blocks, layer 17, from the collapsed primary rampart), a phase which it is impossible to date with any certainty¹.

The best documented and most secure evidence for early iron-working in this region is that from the univallate plateau fort of Winklebury Camp, Basingstoke, examined in advance of redevelopment in 1959, and more recently in 1975-76. Although the excavations of Robertson-Mackay and Smith cannot be related stratigraphically, similarities in the pottery assemblages derived from each - bipartite bowls, some furrowed, some burnished, others decorated with incised, punched, stabbed, inlaid and finger-impressed designs, and with finger-tip or nail impressions along and beneath the rim, and coarse bipartite jars with finger-tipping around the shoulder and along or beneath the rim - suggest that the first settlement, comprising post-built circular structures, four-posters and pits, was defended by a timber-framed rampart and flat-bottomed ditch. The two radiocarbon determinations pertaining to this phase are not helpful, one being a contaminated sample, the other coming from a post-built hut, the orientation of which suggests that it was constructed late in the early phase; all the pottery from this phase belongs to the decorative tradition suggesting, as Barrett and Bradley commented, that

¹ Layer 11a contained no pottery, nor did its equivalent on Site C, layer 6.

"occupation commenced earlier than the few carbon dates suggest" (Barrett and Bradley, 1980b, 201).

Though all the iron artefacts from the site belong to Phase 2, ironworking débris was found in two features which can be assigned to the first phase of occupation on ceramic grounds (Pit 1399 and Posthole 3657; fig. 30.1; 31; 16, 18, 20 and 23). The former, a shallow rectangular pit with vertical sides and flat base yielded "vitrified clay", "furnace lining" and ironworking slag, the latter, a single post-hole, merely ironworking slag. In view of the importance of this evidence the relevant passage from Bayley's technological report is quoted below *in extenso* (in Smith, 1977, 80):

"'Furnace-lining' is not necessarily what its name implies but could also be clay which has been strongly heated and similarly fluxed on one side. The glassy slag-like surface produced may or may not contain large amounts of iron. This grades into a layer of highly vesicular vitrified clay which in turn becomes ordinary highly fired clay. 'Furnace-lining' is thus also produced when a pit is cut into, or lined with, clay and is used to contain a fire for ironworking or melting of copper or other metals. 'Ironworking slag' is a rather vague term which covers both smelting and smithing slags. It is used here because much of the material is ambiguous. Some of the smaller pieces almost certainly represent smithing but the larger bun-shaped masses of iron-working slag (up to 10 centimetres diameter) could have been produced by either large-scale smithing or small-scale smelting operations. Some of the slag is reminiscent of the 'tap-slag' associated with larger scale iron smelting, but no direct comparisons can be drawn. The presence of what are apparently iron 'ore' nodules of various types cannot be taken as a positive indication of smelting as none have been specifically roasted, so their presence may therefore be fortuitous. The iron ores recovered were found to be of a number of different types, including "fired" ferruginous sandstone, pieces of "box-stone" and nodules of limonitised pyrites and several pieces of haematite ... In the absence of distinctive features no firmer conclusions are possible at this stage."

The reasons for the inclusion of Hengistbury Head and Eldon's Seat in the secondary rather than the primary catalogue ought perhaps to be clarified. In the case of the former, a seventy hectare promontory fort defended by a double ditch and bank running across the neck of a peninsula jutting out from the east coast of Dorset, both the heavily disturbed nature of the site and the excavator's methods of retrieving and reporting the evidence derived from his campaigns of 1911-12 (Bushe-Fox, 1915) limit the latter's value. Through the digging of long, narrow trenches, hearths, hut-circles and layers of clay and wattle were observed, but not so stratigraphic relationships. Moreover, decorative tradition pottery associated with six of these features - bipartite decorated bowls and coarsely-made large jars with upstanding or outbent rims, decorated with finger-tip or nail impressions on shoulders or rims, or with incisions (Bushe-Fox, 1915, Pl. X 1-7; Pl. XVI 10-13; Cunliffe, 1978b, fig. 12, 6-9; 14, 15 and 17) - was grouped in the report with haematite bowls with flaring rims (Cunliffe, *ibid.*, fig. 12, 1-5, 10-13) under the appellation "Class A" pottery; the two are inextricably linked and no means of disentangling them is provided. The lack of reported finds' locations also prohibits relationships being demonstrated between metalwork (bronze artefacts and "ironstone") and pottery; even the Armorican axe (Bushe-Foxe, *ibid.*, Pl. XXX, no. 12) and the fragments of a second cannot be conclusively related to the early pottery, the only provenance for the former being "from site 33", an area, alas, especially disturbed by rabbit burrows. The evidence from the unenclosed settlement at Eldon's Seat, Encombe (Frend, 1950; Adorian and Keil, 1961; Cunliffe and Phillipson, 1968) has been relegated to the secondary list as the ironwork therein, a rod eight

centimetres long, came from Layer D₃ which can be attributed on stratigraphic grounds to Phase IIC in the settlement's history; though the ceramic assemblage from this phase does indeed contain decorative tradition vessels (sherds of fine bipartite haematite-coated bowls, round-shouldered jars with geometric decoration, stabbing and incisions, and jars and bowls decorated with finger-tipping on rims and carinations), haematite-coated bowls with vertical sides above the shoulders or flaring rims, open pans with thickened flat-topped rims and coarse plain jars predominate - and it is the date of the latter which should be applied to the rod. Admittedly, there is disturbance in this area resulting in material from Period I (sherds of Deverel Rimbury and plain ware vessels) becoming incorporated in layer D₃ (*ibid.*, fig. 14, nos. 87, 90 and 91), and it should be acknowledged that the iron may possibly have belonged to the earlier phase of occupation; in the absence of any means of substantiating this claim. however, the chronology suggested above must be upheld.

Three further sites of potential interest which might have been placed in the primary catalogue but for obscurities in their reports which thus demand their relegation to the secondary list are those of Langton Matravers, Dorset, Woodtown Farm, West Parley, Dorset and Quarry Lodden, Bincombe, Dorset. In the case of the former settlement, the report fails to provide any details about the context or associations of the ring found therein, a sorry omission in view of the substantial, and exclusively early, ceramic assemblage derived from the lowest level of the section (Calkin and Piggett, 1938, 66-72). In the case of the second, simply apprehended in a single, accidental, section, it is impossible to ascertain the date of the pottery apparently associated with iron slags, bloom and raw material, owing to the

sketchy nature of the descriptions and illustrations of the vessels contained in the report (Drew, 1929, 232-6). As for the third (Bailey and Flatters, 1971), it was omitted on the grounds that it is impossible to be certain that the fragmentary iron knife-blade found during trial excavation of this Iron Age and Romano-British site was securely stratified in Layer 6 as reported, the lower levels having suffered considerable disturbance (as mentioned in the text though omitted in the section drawings). One further site in the secondary catalogue which demands mention is that of Rope Lake Hole, Kimmeridge, Dorset which, when published, appeared to contain iron slag and iron pyrites in association with pottery of the decorative tradition. These materials have since been analysed by Biek (pers. comm. P. Cox) the former proving to be merely the residue of shale (artefacts of which occurred on site) burned in aerobic conditions, while the latter's presence on site may simply be accidental, resulting from the collection of shale from the Kimmeridge clay beds (Maw, 1975, 51)¹.

¹ One further site demands mention, albeit cursory, namely Everley Water Meadow, Stepleton, Dorset (ST 841 114); preliminary investigation within a relict stream bed revealed a stone mould for a Bulford-Helsbury axe, associated with iron slag which, on analysis, proved to be "furnace slag". Further comment must await the investigation of a larger area and the processing of the material extracted from this same layer (Layer 15) for radiocarbon dating - but it should be noted that sherds of unabraded "Late Bronze Age pottery" were also found within the stream bed. I thank Mr. R.J. Mercer for this information.

SOUTH WESTERN PENINSULA

Discussion of the evidence from this region - comprising Cornwall, Devon and the uplands of South Western Somerset, an area of rolling grass and heather moorlands dominated by the granite masses of Dartmoor, Bodmin, Hensbarrow, Carnmenellis and Penrith and the sandstone uplands of Exmoor, set apart from neighbouring geographical areas by the Somerset Levels, a trough of fen and moorland extending from the foot of the Mendips to the Quantocks - will not be prefaced by a lengthy introduction as in the case of previous sections owing to the paucity of the available information.

Considerable fieldwork and excavation has been carried out in the area from the 1930's onwards, the history of which is documented in the following reviews by Wainwright *et al.* (1979, 2); Bosanko (1980), Johnson (1980, 142-3) and Balaam *et al.* (1982, 267-8), culminating in an upsurge of activity since the late 60's with the establishment of the County Sites and Monuments Registers and the Committees for Rescue Archaeology in Cornwall and Devon (Thomas, 1976, 10-13), the research of the Dartmoor Reave Project and the involvement of the Central Excavation Unit. Despite such activity, however, study of the Late Bronze Age - Early Iron Age transition has advanced little. Two problems in particular have contributed to this state of affairs, first the destructive nature of the soils in this region (which militates against the survival of bone, metal and pottery) and, secondly, the lack of diagnostic and securely associated early first millennium pottery (Johnson, 1980, 141; Silvester, 1980, 29). Thus as recently as 1980, Johnson could write:

"Evidence for settlement in the early 1st millennium B.C. is extremely sparse. It consists of sherds, redated from Iron Age "A" to probable Late Bronze Age and of several assumptions. Few sites have produced sherds that are both diagnostic and found in association with structural features; even fewer occupation sites have produced any type of metalwork".

(Johnson, 1980, 169; 141)

Similarly, Silvester has written:

"The study of the transitional period from Bronze Age to Iron Age is handicapped by the almost total absence of diagnostic artifacts from relevant excavations".

(Silvester, 1979, 177)

Recent developments are, however, helping to fill this gap, most notably the recognition of, and subsequent establishment of a sequence for, early first millennium pottery. Prior to the late-seventies the accepted ceramic scheme for the area, that of ApSimon and Greenfield (1972), viewed Trevisker style wares as continuing to the end of the Bronze Age (Fox, 1973, 100)¹, but since then evidence for post-Trevisker developments similar to those already observed in the earlier first millennium in Wiltshire, Dorset and Hampshire has begun to emerge. Despite the tentative nature of such proposals - relevant assemblages are few and associated dating evidence scarce - it does appear as though here, too, a tradition of plain ware vessels dating to the eleventh-ninth centuries was followed by new forms of decorated

¹ Evidence that Trevisker styles did continue into the Later Bronze Age is provided by the lugged sherd decorated with herringbone incisions from a pit beneath the rampart at Killibury hillfort, Egloshayle, Cornwall (Miles *et al.*, 1977, 108; sherd P 29, fig. 41). The following two radiocarbon dates also derive from pre-rampart features and may be used to date the sherd's context: (Har 1952) 730 \pm 70 b.c.; (Har 2191) 840 \pm 70 b.c.

vessels in the eighth century. The largest and best-documented plain ware assemblage is that from the recent, 1975, excavations at the open settlement on Miltor Mator Common, Dainton, Devon (Silvester, 1980, 26-9, fig. 9.1-22; Needham, 1980b) comprising simple bowl and jar forms - insofar as the fragmentary evidence permits reconstruction - in coarse gritted fabrics with roughly smoothed surfaces, with inturned, flat-topped or everted rims and sparse decoration (confined to deeply incised transverse rim grooves and lugs); similar material is to be found on the Dartmoor settlements of Foales Arrishes (Radford, 1952, 71-3, fig. 13.6, Pl. VIII, 4 and fig. 13.5, Pl. VIII, 5), Smallacombe Rocks (Radford, 1952, fig. 13.2) and Shaugh Moor (Wainwright and Smith, 1980, P5, fig. 18, House 19), at Bodrifty, Cornwall (Dudley, 1956, fig. 9; Silvester, 1980, 29) and from among the multi-period assemblages from Kent's Cavern and Mount Batten, Cornwall (Clarke, 1971, fig. 6.1 and 6.2, 149). Dating this tradition - if indeed it can be so called at this stage - is difficult, as only the Dainton assemblage yields chronologically useful material in close association¹; there, plain ware sherds were found both within and around a pit containing mould debris which, when reconstructed, form the matrices of bronze types current in the Wilburton-Wallington industrial tradition of the tenth century B.C. (Needham, 1980b).

The identification and dating of the succeeding tradition comprising shouldered jars and bipartite bowls in finer fabrics, more varied rim forms and decorated with finger-tip and incised motifs on the shoulders, cabling on the rims and the application of haematite slips on

¹ Sadly, it is impossible to postulate any association between the Late Bronze Age metalwork and the pottery from Mount Batten, as such evidence merely came from redeposited midden material.

the surface, is equally tentative. The topic requires considerable study and little can be surmised at this stage, save that, by comparison with material in neighbouring areas, the tradition appears to have begun in the eighth century B.C. Relevant assemblages are listed in the secondary catalogue, the largest and best documented being that from the earlier excavations at Dainton in 1939 and 1949 detailed in the primary list.

PRIMARY CATALOGUE

DAINTON, Devon

(centre at) SX 858 667

System of small rectilinear fields delimited by banks of rubble and low stone mounds perhaps up to eight hectares in extent, on Miltor Mator Common, five kms south of Newton Abbot. The history of research into this complex is as follows: field system recognised in late 1930's; limited excavations on the southern part of the site by Willis and Rogers in 1939 and 1949; remainder of field system planned by local fieldworker between 1966 and 1975; further excavations undertaken by Silvester in 1975 in advance of continuing obliteration of field-system by limestone quarry. The earlier campaigns comprised the excavation of 4 stone cairns (wrongly interpreted as hut platforms) and the sectioning of the rubble and limestone revetted field-banks, and yielded a large assemblage of decorated ware - large shouldered jars decorated with finger-tipping on the shoulders, cabling on the rims, moulding around the bases and haematite coating - charcoal, animal bone, stone, flint artefacts and iron, the latter as nodules of haematite and limonite (both are types foreign to the area), as slag, and as a thin sliver of worked metal of unidentifiable form; sadly, owing to the denuded state of the site, no stratigraphy was recognised. The later

excavations, designed to test whether the mounds were indeed hut platforms, examined three cairns and one of the field banks, revealing that the former were no more than stone clearance heaps. Again, stratigraphy was indiscernible, the finds simply being distributed throughout the topsoil and in narrow fissures in the limestone. Pottery (of plain ware type) and flint were recovered, as well as the remarkable assemblage of mould and crucible débris referred to above, and three fragments of bronze.

Bibl.: Willis and Rogers, 1951.

Silvester, 1979, 1980.

Johnson, 1980.

Needham, 1980.

DEAN MOOR, Devon

SX 678 654

Stone-walled, sub-rectangular one hectare enclosure containing circular post-built huts on a tract of land on bank of River Avon. The site yielded the following metallurgical débris: a lump of tin ore from the floor of Hut 5b, a blob of tin from the floor of Hut 7 and, most importantly in the present context, 25 kgs of iron ore (high grade ironstone of haematite specularite type) broken up into small fragments both embedded in the core of the wall, and sealed under the floor of Hut 2. In both cases, the ore was associated with Middle Bronze Age pottery, straight-sided jars of granitic and quartz-gritted ware with heavy flat rims, decorated with lugs, flat cordons, cord impressions and incised grooves.

Bibl.: Fox, 1957

Champion, 1976, 276

Pearce, 1976, 28.

NORTON FITZWARREN, Somerset

ST 195262/3

Univallate 4.5 hectare hillfort on low hill three miles north-west of centre of Taunton. Three seasons of excavation carried out by the Somerset Archaeological Society in 1968, 1970 and 1971 comprised trenches in the interior and sections across the ditches and the counter-scarp bank; six phases of occupation from Early Neolithic to Roman were recognised. That which is of concern here, Phase III, was represented by a scatter of sherds in the upper fill of the ditch of the Middle Bronze Age enclosure and from two large pits in trenches F and G; such sherds were unconnected with the Iron Age defences (those from the pits being sealed by the back of the Later Iron Age rampart which is associated with Glastonbury ware), suggestive of the site having been unenclosed at this period. One of these pits produced iron slag, thought to indicate the exploitation of Brendon Hills ore as will be discussed in the text.

Bibl.: H. St George Gray, 1908.
Langmaid, 1968, 1970, 1971.
Selkirk, 1971.

DISCUSSION

As is apparent from the foregoing catalogue, few sites have rendered secure evidence of ironworking in the period under review, and consequently the following discussion is exceedingly brief. The region, however, contains one of the most noteworthy early occurrences of iron in Great Britain, namely the cache of 25 kilos of ore from Hut 2 within the enclosed settlement at Dean Moor, Devon. The material, haematite specularite nodules of dark cindery appearance, can be securely related to the construction of the hut (having been found tightly wedged in a pocket behind and under the inner wall and sealed under the floor), and dated by securely stratified Middle Bronze Age sherds as stated in the catalogue. The nearest source of the ore is in the killas and Devonian limestone formations at Buckfastleigh, eight kms to the South-East; to mine such material from outcrops there, break it up into manageable nodules less than ten centimetres across and transport it laboriously back to the settlement presumes a knowledge of its pyrotechnic potential, if not of the technology necessary to effect that transformation.

Little conclusive information can be drawn from the other two sites in the primary catalogue, Dainton and Norton Fitzwarren. The earlier excavations at the former site, in which four stone mounds and several of the field banks were examined, yielded iron in the form of haematite and limonite nodules weighing several kilos, two lumps of slag and a narrow sliver of forged iron, as well as the decorated pottery described in the catalogue, spindlewhorls of baked clay, shale and sandstone, saddle-querns and flint artefacts. Caution should be observed when discussing this site, however, for though multiperiodicity is assumed - consider, for instance, the excavators' remarks about the sequence of

construction of the Larger Mound and the crescentic bank (Willis and Rogers, 1951, 96), no stratigraphy was recognised, the finds coming either from the surface or from crevices within the limestone bedrock which lay immediately below the turf; while it may be permissible to link the date of the ironworking with that of the pottery (only two sherds of later forms having been found in this, southern, area of the site) speculation is unwise owing to ambiguities in the excavation and its report. The evidence from Norton Fitzwarren, Somerset, is scarcely more conclusive, for while the iron slag from this site came from a pit which also contained sherds of situlate jars with finger-tipping on the carination and outer edge of the rims, biconical bowls and shouldered jars (which, despite Johnson's assertion to the contrary [1980, 172] would appear to date to the Late Bronze Age - Early Iron Age transition), descriptions or illustrations of this crucial context are lacking in the interim reports published so far; given that the site also yielded abundant evidence of Romano-British ironworking in the form of hearths and slag it would be wise to suspend judgement till the final publication has appeared.

Two sites listed in the secondary catalogue are worth brief consideration, the first being Blackbury Castle, Devon. Though both decorated horizon pottery and iron (in the form of ore and as an unidentifiable fragmentary object) were recovered from this univallate promontory fort excavated by Young and Richardson between 1952 and 1954, ambiguities and omissions in the report prohibit the elucidation of their relationship. The excavators interpreted the glacis defences as being of one period, associated with Middle Iron Age pottery and contemporary with the hut site on Site A12, but it is clear that material from a previous, apparently undefended, settlement became incorporated

in the core of the rampart (viz. the greasy, ashy layers in Trench A₁, at the entrance, Site B, in trenches A₅, A₆, A₉ and on Site S). Such layers contain decorated pottery (fig. 7, 1-4) and triangular baked clay loomweights, material which is completely absent from the clay make-up of the dump rampart which in turn contains high-shouldered plain jars, globular and bead-rim bowls and a fragment of a haematite cordoned bowl (fig. 8: 11-48; 9: 49-57). From the evidence contained in the report, however, it is impossible to relate any of the iron débris to such a phase; some of the slag undoubtedly relates to the Middle Iron Age occupation (such as that from the fire-pit on site A₁₂ associated with a bead-rim bowl, that from the make-up in trench A₃ and that from the crest of the rampart), but no means exist of ascertaining whether the remainder¹ was rubbish survival from the putative early phase owing to the excavators' failure to describe its location precisely.

The open settlement of Kestor, Chagford, Devon has not been included in the primary catalogue, for though excavations in the central hut of the Round Pound yielded sherds with flat-topped upright rims, decorated with finger-impressions on the shoulders and round-shouldered bowls (and perhaps even some plain ware sherds, [Johnson 1980, 150]), the abundant evidence for ironworking therein in the form of a bowl furnace, a forging pit, fragments of micaceous ore and a large quantity of slag, cannot be associated with such material. Silvester has re-interpreted the stratigraphy of the hut (1979, 177-9), pointing out that a later medieval construction abutting the western side of the hut has confused the relationship of the early occupation and the ironworking

¹ For example, the slag from the entrance Site B and the unidentifiable scrap of iron from the rampart (1955, 55).

(as Fox herself admitted, 1954b, 43) and that the latter may thus be viewed as secondary phase activity on the site, either later prehistoric or medieval. While it is impossible to establish the validity of Silvester's contention stratigraphically - note that the relationship of the iron-working features and the hut cannot be established from Section B-C (figure 8) - on purely practical grounds it seems eminently more plausible as the following quotation demonstrates.

"Smelting and forging within a totally enclosed structure would not have been particularly pleasant or safe, and the excavator postulated that a large vent had been left in the roof over the drip pit. This, too, would seem to be impractical ... Such a hole would be a considerable fire hazard, with the structure resembling a very simple blast furnace. There would be the additional problem of the roof timbers being more susceptible to rotting, if such a vent was left. It is perhaps more reasonable to assume that the iron-working was carried out in a ruined hut lacking a roof but where the walls provided some shelter."

(Silvester, 1979, 178-9)

NORTH SOMERSET AND THE COTSWOLDS

As with the previous section, discussion of the material from the region to be considered below, comprising the lowlying area of Somerset north of the Quantock-Brendon ridge, the Mendips and the Cotswolds, will not be prefaced by a lengthy historical résumé owing to the paucity of Late Bronze Age - Early Iron Age research conducted in this area. Two thriving county societies have existed in this region since the late nineteenth century, as well as the more recently founded University of Bristol Spelaeological Society which has investigated contexts more varied than its name suggests (ApSimon, 1969). Nonetheless, few sites pertaining to the period under discussion have been examined, attention being focussed on the later Iron Age villages of Meare and Glastonbury (Bulleid and Gray, 1911, 1948) and associated pottery, the Neolithic and Bronze Age trackways in the Somerset Levels and such hillforts as Bury Hill (Davies and Phillips, 1927), Little Solsbury (Dowden, 1957; 1962; Adams and Falconer, 1935) and Bredon (Hencken, 1938), while those few which are of relevance have been sketchily excavated or inadequately published. The scantiness of the evidence is manifest in the discussion of the earliest Iron Age in Gloucestershire containing in the Bagendon report, a mere two pages long, and by the following comment therein;

"Owing to the sparsity of information, on her map illustrating the regional groups of Iron Age "A", Dr. Kenyon has left Gloucestershire as a blank area, to the west of the Upper Thames area and to the south-west of the Midlands region. Radford also, in his map of storage pits of Little Woodbury type, was obliged to leave the area a blank".

(Cotton and Hawkes in Clifford, 1961, 22)

Recent excavations at Leckhampton Hill, Crickley Hill and Cadbury Castle (Champion, S., 1976; Dixon, 1976; Alcock, 1968, 1970, 1971) and the publication or re-assessment of earlier excavations (Dunning, 1976; Avery *et al.*, 1967, *re* Leckhampton) are helping to fill the gap, but much remains to be done.

The pottery sequence for the area is, however, more fully comprehended and readily dated than that for the South-Western Peninsula owing to the occurrence of well-stratified assemblages, metalwork associations and closely related radiocarbon determinations. One site has been claimed to be particularly useful in these respects, namely the eight hectare trapezoidal multivallate hillfort of Cadbury Castle, excavated by Alcock from 1967 to 1971 and briefly in 1973, and from such evidence an attractively neat unilineal scheme of ceramic development from the Later Bronze Age to the Later Iron Age has been elicited. Such neatness is, however, deceptive and must be questioned before the sequence acquires authority through constant repetition in the literature. The equation of a different pottery type with each layer or constructional phase as outlined in the 1980 report is questionable¹, not least with regard to the two traditions which are of concern here, namely Cadbury 4 and 5, special pleading being resorted to in order that the integrity of the two groups may be preserved in the face of stratigraphic and compositional complications (e.g. Alcock, 1980, 690). Equally questionable are the attempts to date these assemblages by means of extrinsic typology, as the metalwork so commandeered does not appear to be securely associated with the pottery, nor can that of the

¹ I must here acknowledge the influence which Dr. D.V. Clarke's criticisms of the scheme, outlined in a seminar held in Glasgow in 1981, have had upon my own re-assessment of the report.

Ewart Park phase be shown to be contextually separate from that dating to Hallstatt C, as the following extracts from two of the interim reports demonstrate:

"The earlier phases of the Bronze Age have not previously been recorded on the site, but this year a cast-flanged bronze axe is an enigmatic stray. It was found in a furnace area along with pottery and metalwork of the end of the Bronze Age and beginning of the Iron Age. The metalwork included half of a gold Covesea bracelet, a socketed spearhead, a very fine Hallstatt C razor and swan's neck pins".

(Alcock, 1971, 5)

"The clearest sign of renewed activity on the hill takes us into an advanced stage of the Late Bronze Age, in the years after 800 B.C. The evidence is provided by metal objects, both gold and bronze, which were found scattered through the topsoil. The most spectacular was half a gold bracelet in the form of a penannular strip of gold, with a half-round section and outwardly flattened terminals. The humbler bronzes all appear to be local, or at least to be the products of Irish or British bronzesmiths. They include complete and fragmentary spearheads; knives with a hollow socket to take a bone or wooden handle; and part of a strengthening plate from the base of a large bucket or pail of sheet bronze. The simplest explanation of the Cadbury bronzes, and of the fragmentary bracelet too, is that they came from a hoard."

(Alcock, 1972a, 114)

The rudiments of the scheme are, however, valuable, for there is indeed a progression from a ceramic assemblage of plain ware type to that of the decorative tradition. The former, occurring in layers immediately above those which contain Neolithic material (A126 A, D539) but continuing into the pre-rampart turf (A126, D536, KX016) comprise coarse jars and simple bowls in a fabric tempered with calcite crystals and large fragments of fossil shell, and display such typical Post-Deverel Rimbury features as thin-walled slab construction and

vertical exterior smearing. Bases are slightly splayed, rims incurved and decoration minimal¹, the latter being confined to dimpling and finger-printing below the rims. While the assemblage ought not to be dated by extrapolation from the Ewart Park metalwork mentioned above (*pace* Alcock, 1980, 706), the following radiocarbon determinations have been elicited from layers KX016 and other stratigraphically comparable levels, giving a calibrated range (according to Clark's curve of 1975) of 1430 - 930 B.C.

KX016	SRR	442	1064 ± 75 b.c.	animal bone
K530	I	5973	985 ± 90 b.c.	red deer antler
KX906	SRR	451	955 ± 140 b.c.	charcoal
K618	I	5971	925 ± 90 b.c.	animal bone
KX016	SRR	443	870 ± 110 b.c.	charcoal

(Alcock, 1980, 709; Radiocarbon, 1976, vol. 18, 186; vol. 21, 1979, 174).

Similar assemblages came from Phase II at the promontory fort at Crickley Hill, Gloucestershire², from Stantonbury hillfort, Gloucs. (Wainwright, 1967b, 53), from a buried soil under the ramparts at the hillfort on Bathampton Down, Somerset (Wainwright, 1967b, fig. 5, 1-4) and from layer 4 (area IV) from the occupation site at Combe Hay, Somerset (Price and Watts, 1980) charcoal from which yielded a radiocarbon determination of 700 ± 120 b.c. (Birm 445; *ibid.*, 25); the latter assemblage not only comprised plain jars with hooked rims and straight-sided vessels with applied cordons, but also a few fine

¹ Two vessels only - a biconical jar with finger-printing below the rim and a large tripartite jar - display elaborate decoration, and these are ascribed to the foregoing assemblage purely on account of their fabric in the absence of any stratigraphic control; E701 comes from an oven-pit on the summit of the hill, while 156 (Alcock, 1980, fig. 13) is unstratified.

² Radiocarbon dates are available for Phase II deposits at Crickley: Har. 392 - 2590 ± 60 bp; Har. 393 - 2310 ± 70 bp; Har. 394 - 2350 ± 80 bp (Dixon, 1975, 11-12), though note the warning of possible contamination.

decorated bowls (Barrett, 1975, 103) and should thus be placed late in Barrett's Post-Deverel Rimbury tradition on stylistic grounds.

Increased use of decoration is one of the features which characterises the next group of pottery, stratigraphically successive to that described above at both Crickley Hill and Cadbury Castle¹ and pertaining to Barrett's decorative tradition, Marshall's Chastleton-Shenberrow style (Marshall, 1978a, 9-11). Forms comprise shouldered or biconical jars and fine bipartite bowls, some uncoated, others of haematite furrowed type, while decoration comprises finger-tipping on shoulders and beneath rims, incised or impressed linear patterns or concentric circles, some infilled with white paste, applied knobs, perforated lugs, slashed rims and decorated neck-cordons. Such assemblages occur at the Iron Age ditch complex discovered during the excavation of a Roman temple settlement at Pagan's Hill, Chew Stoke, Som. in 1951-52 (ApSimon, Rahtz and Harris, 1957-8; Rahtz, 1952), from the down on which Bathampton hillfort is situated, though not necessarily from the settlement itself (Wainwright, 1967b, 44-5, fig. 5), Leckhampton Hill, Glos. (Marshall, 1978b, figs 4, 7 and 8), Shenberrow Camp, Glos. (Fell, 1961; see primary catalogue below), Nottingham Hill, Glos. (Hall and Gingell, 1974, 306-7), Merlin's Cave, Symonds Yat, Glos. (Phillips, 1931; Savory, 1971a, 23; 1976b, 249) and from Crickley Hill, Glos. (Dixon, 1973b, fig. 8). The latter three sites all afford potentially useful dating evidence, but only in the case of Crickley has there been

¹As mentioned above, Alcock's sequence is less clear cut than the 1980 report suggests. While the stratigraphic distinction between the "post-Neolithic levels" of A126 A and D539 and the "pre-rampart" layers of A126, D536 and KX016 is clear cut, the ceramic material is not so discretely distributed, with Cadbury 4 pottery occurring exclusively in KX016.

any positive return, that of a radiocarbon date of 570 ± 90 b.c. (Har 391; Radiocarbon, 1977, vol. 19, 404-5) from oak charcoal from a gatepost in the Period 3b entrance (that phase to which most of the decorated pottery belongs; Dixon, 1973b, 10-12, fig. 8). In the case of the other two sites, our understanding of the chronology of this ceramic style has not been advanced by their evidence; the pottery from Merlin's Cave, thought to be from flattened bucket urns and shouldered jars (Savory, 1976b, 249) and of "Late Bronze Age rather than Iron Age A date" (Savory, 1971a, 23) is sadly not available for re-examination, having been destroyed during the Second World War, nor is its association with such Ewart Park metalwork as a bronze bifid tanged razor, roll and nail-headed pins and horse harness, assured¹, while the interim description of the sherds found during trial excavations on the bivallate hillfort of Nottingham Hill, Glos. (Hall and Gingell, 1974, 306-7), seemingly associated with a collection of Ewart Park metalwork, is not sufficiently detailed to permit certain attribution to this tradition. As for the "association" between the Cadbury 5 pottery and the two Hallstatt C razors (Alcock, 1980, 706), this has already been called into question (see above). Such a tradition appears to have petered out completely by the 5th century B.C. with the appearance of the Salmonsbury - Broadway and Glastonbury - Blaise Castle ceramic styles (after Marshall and ApSimon) comprising linear tooled bowls, barrel-shaped jars and plain burnished round-shouldered or bead-rimmed bowls, found on such sites as Little Solsbury, Glos., Brean Down, Somerset, Gough's Old Cave, Glos. and Blaise Castle, Somerset.

¹The razor, for example, was not found under controlled archaeological conditions, but merely by a schoolboy rummaging in the cave prior to excavation. Incidentally, all the *iron* therein derives from disturbed material.

PRIMARY CATALOGUE

BURLEDGE CAMP, North Widcombe, Somerset

ST 582 285

A trial excavation lasting 5 days was conducted on this 2.2 hectare promontory camp situated on a tongue of high land 2 kms south-west of Bishop Sutton in March 1955, during which time 30 test holes were dug in the interior. A thick layer of occupation material was revealed in the south-west corner of the site comprising structural features such as pits, post and stake-holes, gullies, ditches and putative bowl furnaces, and artefacts such as pottery, iron slag, animal bones, part of an iron fibula and a saddle quern. Occupation of this site has been interpreted as being of two phases, both originally classified as of "Iron Age A" date on the basis of the ceramic evidence. That from the first phase may indeed belong to our decorative tradition and may even be contemporary with the metal-working evidence - but sadly both the investigation and the documentation of the site are of such a standard as to preclude certainty.

Bibl.: Crook and Tratman, 1949, 52-4.
 ApSimon, 1956-7, 40; 1969, 46-7.

CRICKLEY HILL, Gloucestershire

SO 927 161

3.6 hectare univallate hillfort situated on a steep westward facing scarp which forms part of the Cotswold escarpment, 6.5 kms to the south of Cheltenham. The site has been under excavation every summer since 1969. In summary, three periods of occupation have been recognised:

Period 1: pre-rampart occupation.

Period 2: construction of rampart with front and rear stone walls laced with horizontal and vertical timbers; interior occupation consisted of three aisled post-built longhouses. The associated pottery comprised coarse undecorated wares in coarse fabrics and with sagging shoulders and irregular rims. The only decorated vessel consisted of an angular bowl with incised decoration.

Period 3: rampart and gate reconstruction. The associated structural remains consist of circular huts while the pottery comprises coarse angular round-shouldered jars decorated with finger-tipping and small carinated bowls decorated with incised linear designs generally in the form of chevrons, or slashings infilled with white paste.

Bibl.: Dixon, 1973a,b; 1975; 1976.

KINGS WESTON HILL, Somerset

ST 550 779

5 tumuli on open downland on the eastern half of Kings Weston Hill to the north of Bristol. Tumulus 2, a low circular mound, was thought to have yielded an Iron Age cheekpiece in direct association with a fine ware bowl decorated with finger-tipping along its shoulder. A full description of the stratigraphy and location of the finds is given below as this is of crucial importance to the discussion which follows. The stratification of the tumulus was as follows:

- "1. Turf 4 inches
2. Stones with a fair quantity of earth, 12 inches
3. A hearth 2 inches
4. Bedrock."

"The greater part of the finds came from the hearth which was proved to be roughly circular with a diameter of ten feet. Excavations were continued beyond its area for two feet all round, but no finds were obtained. The smaller portion of the finds came from Layer 2 in the area vertically above the hearth. The finds include pottery, a few fragments of flint, an iron article, charcoal, burnt human bone, burnt and unburnt animal bones."

(Tratman, 1925, 238-9)

Bibl.: Tratman, 1925.
 Dobson, 1931, 100.
 O'Neill and Grinsell, 1960, 99.
 Godman, 1972, 47.
 Green, 1973.

SALMONSBURY, Gloucestershire

SP 173 208

Rectilinear bivallate hillfort of 22 hectares on the eastern side of the Cotswolds to the east of Bourton-on-the Water, lying on almost flat ground on a gravel spread between the Rivers Windrush and Dikkler. 4 seasons of excavation conducted between 1931 and 1934 revealed a sequence of occupation running from the Neolithic to the Roman period - when the ramparts were partly levelled. Only on Site 1, a section through the south-eastern defences, was evidence relevant to this study revealed, comprising coarse sherds from shouldered jars decorated with finger impressions, an iron strip and a small bronze loop lying in and on the turf-line beneath the inner rampart.

Bibl.: Dunning, 1931; 1976.

Mus.: Cheltenham.

SHENBERROW CAMP, Stanton, Gloucestershire

SP 030 334

1 hectare D-shaped bivallate plateau enclosure towards north-east end of Cotswold escarpment in the parish of Stanton. Trial excavations conducted in July 1935, comprising 7 cuttings through the defences and in the interior, revealed that the single phase defended settlement was preceded by an open settlement. An area stripped inside the angle formed by the junction of the south-west and north-west ramparts, Site A, revealed evidence of occupation interpreted as the site of a rectangular hut, the stratigraphy of which was as follows:

"a dark occupation layer, averaging 6" thick, overlay discontinuous areas of rough stone pavement resting on an ash-dressed, rammed gravel floor on a sub-structure of stones (which itself rested on an area of burnt stones on undisturbed subsoil)".

Decorative horizon pottery comprising decorated shouldered jars with flat-topped rims, some with internal thickening, others with finger-tipping along the top, plain straight-sided vessels and fine bipartite bowls, came both from above and below the gravel floor, and from that layer itself came a rectangular-sectioned iron punch (Fell, 1961, fig. 7, no. 9). Further metalwork derives from the dark occupation layer - a fragment of a small iron ring, a broken oval link, a fragment of a bronze ring and a bracelet with engraved ring and dot ornament; the location of the latter high in the dark occupation layer is thought to indicate the possibility of later disturbance in this area, which fact, coupled with the occurrence of Romano-British pottery and metalwork directly above the dark layer, raises uncertainty about the contexts of the other metalwork on this site. An iron mount with two rivets came from a secure contexts on Site F associated with decorative tradition pottery (Fell, 1961, fig. 7, no. 10). Other finds

include flint artefacts, a whetstone, a stone spindle whorl, rubber and fragments of a rotary quern.

Bibl.: Clark, 1935, 137; Fell, 1961.

DISCUSSION

Discussion of the evidence from this region will be brief, for as the foregoing catalogue has shown, the amount of iron recovered, indeed of metalwork in general, is negligible. The earliest occurrence comes from the promontory fort on Crickley Hill, Glos., that of a flat blade-like fragment of iron (23 mm maximum dimension) seemingly securely stratified on the final Neolithic land surface beneath the Neolithic Long Mound; no disturbance was noted and the object displays the same patina as the flint recovered from the same deposit. Controversy over its authenticity has naturally been aroused and it would be prudent to reserve judgement until the publication of the final report rather than venture untutored speculations. Even if it were proved spurious, the site of Crickley would still merit inclusion in the primary catalogue as one of the porched roundhouses from the second settlement, Hut B4, attributed to Period 3b (Dixon, 1973b, 9; 1975, 5-6), that phase which yielded the radiocarbon date of 570 ± 90 b.c. (Har 391) quoted above, contained a hearth round which there were signs of heavy burning (in the region of 1200-1300°C) and "some fragments of iron" (Dixon *in litt.*, 1981). Evidence of ironworking in the form of slag and putative bowl furnaces has also been recovered from Burledge Camp but identification of the context and date of this material is hampered by the inadequacies of the trial excavation and subsequent publication; occupation on the site was apparently lengthy and the ironworking could be ascribed

equally to the Middle Iron Age phase (as evidenced by the pottery and an iron fibula) as to that of the decorative horizon pottery.

The evidence from two of the other sites in the primary catalogue is even more unsatisfactory; that from Salmonsbury merely comprises a "bent strip of iron" from the undefended settlement phase prior to the construction of the hillfort (Dunning, 1976, 80), while that from Shenberrow is scarcely more substantial, amounting to a fragmentary iron ring, a broken link, a punch and a fragile iron fitting with two rivet holes. On this site only the latter is securely stratified and definitely associated with decorative tradition pottery, as careful reading of the report reveals the possibility of disturbance on Site A.

The most substantial iron artefact from the entire region is that of the curved, circular-sectioned cheekpiece with knob terminals from Barrow 2 on Kings Weston Hill of a type current in Europe from Hallstatt B₃ to Hallstatt C₂ (Balkwill, 1973; 448, list 2; Mariën, 1958, 214-226); the date of this particular example, however, cannot be determined more precisely as it was not found in direct association with any other artefacts, as scrutiny of the report reveals. It is generally believed that the cheekpiece occurred as part of the barrow's primary cremation associated with fragments of a shouldered bowl decorated with finger-tipping (O'Neill and Grinsell, 1960, 99), but such a report is erroneous in two respects. Firstly, Piggott has argued (*in litt.* to C.F.C. Hawkes)¹ that the sherds ought to be reconstructed to form a Food Vessel urn, with the result that the primary cremation from Barrow 2 now accords perfectly with the Early - Early Middle Bronze Age dates

¹I owe this information to the kindness of Professor Hawkes who allowed me to examine private papers regarding this find prior to his own publication of it.

proposed by Green (1973) with regard to Barrows 1 and 3. Secondly, it appears that the cheekpiece lay in the stones overlying the circular hearth which contained the primary cremation, thus belonging rather to a secondary deposit; the description of the cheekpiece's location provided in the original report is ambiguous as pointed out in the catalogue, but Hawkes, working from more detailed information, has declared (*in litt.* to Piggott, 1977);

"the [cheekpiece] was plainly in the stones overlying Tratman's hearth and in no association"

The omission of two major sites from the primary catalogue requires justification as both are known to have produced iron and decorative tradition pottery. In the case of Cadbury Castle, the earliest iron artefact, "an indeterminate and unillustrable fragment" (Alcock, 1980, 680) is a residual find deriving from a secondary phase of Rampart B, Cadbury 7, associated with a bowl with beaded rim and hatched triangular decoration on a burnished surface, and loosely ascribed to "Cadbury 5/6". That from the second site, namely Leckhampton Hill (Burrow *et al.*, 1925; Champion, S., 1976; Marshall, 1978b) recently reinterpreted as being a single period hillfort with timber-laced rampart, likewise cannot be linked with the decorated shouldered jars and fine incised bowls recovered from the ditch during the 1925 excavations and from the rampart in the later campaigns (Marshall, 1978b, fig. 4: 7 and 8), having come instead from disturbed material in the ditch of a barrow outside the hillfort.

WALES AND THE MARCHES

In describing the occurrence of iron prior to the sixth century B.C. in Wales and the Marches no attempt will be made, as in previous sections, to preface the primary catalogue and ensuing discussion with a description of the ceramic sequence, the reasons for this being various. In the first place, understanding of that sequence is currently in a state of flux; the evidence - and especially that of the radiocarbon dates - from a recent spate of excavations at the Breiddin (Montgom.; Musson, 1976), Moel y Gaer (Flintshire; Guilbert, 1976), Dinorben (Denbigh; Guilbert, 1979, 1980) and Croft Ambrey (Hereford; Stanford, 1974), is only now being assimilated and while it clearly overturns the cultural and chronological sequences previously established (derived from the results of excavations at such sites as Dinorben and Coygan Camp: Gardner and Savory, 1964; Savory, 1971a and b; Wainwright, 1967a), the pottery available even now is both so scanty and undistinguished as to preclude construction of a revised ceramic sequence¹. To use the frameworks offered by Wainwright (*ibid.*) and Savory (1976a and b) would be to depress the dates of the pottery relative to the equivalent material from Southern England which has been dated rather more securely by means of stratified sequences, metalwork associations and radiocarbon determinations, as described above; on the other hand, to build a ceramic sequence for the entire area on the basis of such a scanty and biased sample from the Central and Northern

¹ The most recent consideration of the topic merely points out that plain coarse shouldered jars of post-Deverel Rimbury tradition form occur at the Breiddin associated with the first rampart (Burgess, 1980, fig. 7.5, A-S) and espouses the hope that "further work on Welsh hillforts will make clearer the local response to the (ceramic) developments (in neighbouring areas of Southern England outlined by Barrett)" (Burgess, 1980 273).

Marches - for clearly the cultural diversity of the Province in later prehistory cannot be reflected in a sample which concentrates on one region and a single monument type - would be equally inadvisable. Happily, however, the date of the ironwork from the one site which merits inclusion in the primary catalogue, that of Llyn Fawr, Glam., is not dependant upon the construction of such a scheme since it both comprises, and is associated with, intrinsically datable artefact types, while groups of radiocarbon determinations have been recovered from the two other major sites to be considered, those of the Breiddin and Dinorben. Such means obviate the need for a discussion of the available pottery, allowing the proper topic of this study to be discussed without further introduction.

PRIMARY CATALOGUE

LLYN FAWR, Rhigos, Glam.

SN 917 035

Hoard of bronze and iron artefacts discovered by workmen in 1911 and 1912 while draining a lake in the Parish of Rhigos, North Glamorganshire, to form a reservoir. The accounts of the context of this discovery vary markedly, as do the interpretations placed upon the felled wood apparently found close by - for these see Crawford and Wheeler, 1921, 133-4; Fox and Hyde, 1939, 376; all that can be said with certainty is that the objects were found "*in a small area* [my italics] on the east side" of the lake, "lying in peat on the bed of the lake" (Savory, 1980a, 124). The following list comprises those objects which have been donated to the National Museum of Wales but further artefacts are thought to have been retained by those who made the discovery.

Bronze

- 5 socketed axes, and one fragment of a further axe, of Sompting form, decorated with rib and pellet designs.
- 3 socketed gouges.
- 1 hollow winged object and a fragment of a second, though originally to be chapes but later re-interpreted as cheekpieces (Alcock, 1961).
- 1 single-edged razor with triangular blade and double-looped handle.
- 1 rectangular openwork plate with 5 pendant concentrically-ribbed discs - termed a "yoke-mount".
- 3 phalerae with cast loops.
- 2 bronze sickles.
- 1 rectangular terminal, open at one end, closed at the other with a hook, termed a "strap-end".
- 1 sheet bronze cauldron formed of 5 sheets of bronze riveted together with round- or conical-headed rivets, with grooved ring-handles secured by cast staples and a rolled rim. This artefact was apparently "dug up near the middle of the lake at a distance of some 200 feet (60 metres) north-west of the main site" (Crawford and Wheeler, 1921, 134).

Iron

- 1 heeled socketed sickle with carburized blade, a copy of local bronze forms (fig. 6).
- 1 spearhead with lozenge-sectioned leaf-shaped blade (fig. 5c) found "with or near the bronze objects" (Crawford and Wheeler, 1921, 134).

A bronze cauldron similar to that described above and likewise displaying signs of wear and repair, and an iron Mindelheim sword with broad midrib and marked ricasso (Plate 7; N.M.W.) were found "a little later than the others in a comparatively small area on the East side of the lake" (Fox and Hyde, 1939, 377), but are interpreted as being part of the hoard (Savory, 1980a, 125). Consideration of the date and nature of the deposit, and of its integrity, are contained in the text.

- Bibl.: Crawford and Wheeler, 1921.
 B.B.C.S. vol VIII, pt. III, (1936), 273-4.
 Fox and Hyde, 1939.
 Alcock, 1961.
 Savory, 1975, 121-4; 1980a, 123-5, figs. 7 and 46.

Mus.: N.M.W. 12.11.1-21; 36.624.1-2

DISCUSSION

It is unfortunate that discussion of the date of the adoption of iron in Wales and the Marches should have to be dependant at present upon the evidence of the above site with its developed ironwork, for it is clear that in this region, more so than in any other, such a date is blurred by the nature of the archaeological record. The ironwork from pre-seventh century contexts being either insecurely stratified or insufficiently published as described below, it is inevitable that the secure date offered by this find be over-emphasised; it must, however, be understood at the outset that the location and nature of the deposit have ensured the survival of the iron objects which may in fact be late products of the emergent Welsh iron industry - a suggestion reinforced by their rôle and the inherent extravagance in the use of iron.

Had the iron artefacts in the Llyn Fawr lake been of less recognisable types it is conceivable that even their dates would have been in dispute. Great care is needed when assessing the date of manufacture of objects in a votive hoard¹ - a deposit which may have accumulated

¹This is especially necessary when discussing those from watery locations where the associations may be dubious - as in the case of the Llyn Fawr hoard itself. While it is likely that all the artefacts recovered are the reflection of a similar (though not necessarily contemporary) activity in, or attitude towards, the lake, it should be noted that Crawford and Wheeler's reasons for allying the spearhead to the hoard are dubious (1921, 136) - and indeed Leeds dismissed the association of Cauldron 1, that found 60 metres north-west of the deposit (*ibid.*, 136).

over a protracted period - to ensure that this is not merely derived from the date of the latest artefact therein. In the case of the Llyn Fawr hoard it is probable that some of the bronzes belong to the Ewart Park industrial tradition; it is clear from the reports, for instance, that the cauldrons had been in circulation for some time prior to deposition and were probably manufactured during that phase, while the socketed gouges, and possibly even the cheek-pieces (O'Connor, 1980, 255), may be of similar date¹. Thus had the iron artefacts been of undiagnostic forms, it could have been argued that they belonged either to the Ewart Park phase or to Hallstatt C. It is clear on typological grounds, however, that the sword and the spearhead must be assigned to the seventh century, that phase to which the yoke mount, hooked terminal, phalerae, Sompting axes and razor also belong². The blade-section, shoulder form and dimensions of the former are clearly those of an iron version of the Mindelheim type (Cowen, 1967, 384-91; 424-27) dating from Hallstatt C on the Continent (Kossack, 1959, 23-4; Peroni, 1973, fig. 2.1). The date of the latter is harder to determine since so few Continental parallels are known, but an example with similar dimensions derives from a Hallstatt B₂/C context at Forsthaus Schorlenberg, Palatinat (Sprater, 1939; Kimmig, 1964, 276) and another occurs in a Hallstatt C₂ burial context at Court St. Etienne associated with a linear-faceted axe, antennae-pommel sword and flesh hook

¹ It is even conceivable that an eighth century date could be applied to the iron sickle (fig. 6) as it is clearly a locally-produced version of the indigenous developed heeled sickle; one such example occurs in the Carp's Tongue hoard from Longy, Alderney (Kendrick, 1928, 62), but the majority are of seventh century date.

² Phalerae - O'Connor, 1975, 222; razor - Jockenhovel, 1980, 197; yoke-mount - Mariën, 1958, 29-32; O'Connor, 1980, 255.

(Mariën, 1958, Fig. 18.209). It is thus reasonable that a seventh century date be applied to these artefacts (and perhaps also to the sickle; see footnote, p. 160), the manufacture of which will be discussed later.

Several instances of iron in earlier contexts have been recorded but none is sufficiently well-described as to permit certainty about its date and hence inclusion in the primary catalogue; nevertheless these instances require brief consideration. The 2.4 hectare promontory fort at Dinorben, near Abergele, Denbighshire, has been repeatedly excavated (in 1879, 1912-4, 1919-22, 1956-61, 1978-9) and discussed (Savory, 1959; Gardner and Savory, 1964; Savory, 1971a and b; 1976b, 244-7; Alcock, 1972b; Guilbert, 1979 and 1980), and it is not intended to review the history of these campaigns and contentious interpretations here. Suffice it to say that it is exceedingly difficult to determine the date of the iron nails, strip and razor found by Gardner in supposedly "pre-rampart" hut floors (nos. 2, 3, 12 and 18) in the north-eastern sector of the site and assigned by him to "A₂ culture", given that they are not intrinsically datable by typological means¹. Many factors complicate the dating process, not least the considerable disturbance and erosion that evidently occurred in this area (Savory, 1971b, 4). Secondly, there is the problem that though the hut-floors in this area do not simply refer to a single occupation, neither of the

¹Even the "razor" (N.M.W. 61/497/24; Gardner and Savory, 1964, fig. 23.3), a highly corroded and fragmentary single-edged blade tapering to a knobbed tang, cannot be dated by this method. O'Connor (1980, 265) rejects Gardner and Savory's description of the artefact as an iron copy of a Nordic razor and indeed it is even difficult to find any convincing Hallstatt C parallels. While straight blades are characteristic of iron knives (e.g. Mariën, 1958, fig. 16, 214-5), the dimensions of this example are too small for it to be so described - but equally it is unlike the known razors from Western European Hallstatt C contexts which all have curved or convex blades (Mariën, 1958, fig. 43.1; 1964, fig. 81).

principal reports makes clear which huts are definitely pre-rampart and which post; indeed the 1964 report assumes "that nearly all the hut floors of pre-Roman date within the defences were earlier than the first rampart" (Gardner and Savory, 1964, 75-8; Savory, 1971b, 24). Nor is radiocarbon dating any help, as Savory's samples were derived entirely from the 1969 cutting across the south-western defences (Cutting SL VI, Savory, 1971b, 7-12, 76-7), while Guilbert's recent excavations and sampling did not, unfortunately, include this area, but concentrated rather on cuttings in the south-eastern sector; given the complexity of, and longevity of occupation on, this site it would be rash to attempt to relate the most recently acquired dates from Banks 1 and 2 in Area B (Guilbert, 1980) to the north-eastern defences, since the latter have not received the type of sectioning necessary to supply a comparable sequence. Despite lengthy attempts it appears that there is absolutely no means of extrapolating a date for these iron objects from the information contained in the published reports - nor can the matter be solved by further excavation, the hillfort having now been completely destroyed by quarrying.

While there would appear to be evidence of the use of iron prior to the sixth century at a secondly recently re-excavated site, that of the Breiddin, Montgomeryshire, this has unfortunately had to be relegated to the secondary catalogue owing to the paucity of information about the contexts of the iron artefacts available in the interim reports (in *Archaeology in Wales*, 1970-76; Musson, 1976), the final report having not yet been published. Indeed, the original excavations on the site, those of O'Neil between 1933 and 1935 (O'Neil, 1935, 1937a) also produced evidence of iron - a ring, a possible penannular brooch and two pieces of sheet - seemingly in association with a penannular

bronze ring, ribbed socketed axe and a shale armlet stratified beneath the first rampart. However, too much store should not be set by this association (which has subsequently received little attention) as the excavator obviously had difficulty in unravelling the stratigraphy of this section, the sequence being completely reversed in the two reports (O'Neil, 1935, 162; 1937a, 105). Musson's excavations yielded rather more secure evidence, but sadly all that can be said at present is that fragments of two iron knives have been found in association with stake-and-wattle roundhouses (Musson, 1975, 35-7), radiocarbon dates for which are as follows:

B.M. 881	479 ± 55 b.c.
Har 467	460 ± 100 b.c.
B.M. 963	375 ± 63 b.c.

Two excavations carried out immediately before the Second World War prove, on examination, to have yielded little information of value to the present study, the first being O'Neil's campaigns at Fridd Faldwyn, Montgomeryshire between 1937 and 1939 (O'Neil, 1937b; 1942). The eighth century date calculated by Stanford for the construction of the first defences (Stanford, 1971, 43), a twin palisade, is highly contentious being based on the analogy of the sequence at Croft Ambrey (Stanford, 1974) and an estimation of post-replacement and should be disregarded in any assessment of the date of hillforts with timber-built defences in the Central Marches (*pace*, Guilbert, 1975, 207-9). However, this need not be of concern here as scrutiny of the report reveals that none of the iron belongs to such an early phase but rather to the post-sixth century B.C. multivallate twenty-eight hectare hillfort, the two pins stemming from a hearth within the outer defences (Hearth II, Section G) and from a floor behind these defences (Rampart III).

Secondly, Varley's excavations at Eddisbury, Cheshire between 1935 and 1938 (Varley, 1950); in this case it is difficult to argue conclusively that the iron ferrules in the south-eastern gateway belong to an early phase of the hillfort's sequence, namely the defences around the univallate enclosure on the eastern half of the hill, as the details given in the report (Varley, 1950, 34) allow the argument to be upheld with equal validity that these belong to a reconstruction of that entrance, contemporary with the enlargement of the hillfort in the sixth-fourth centuries - to which phase the slag in the outer rampart and ferrule in the northern gateway also belong. As for the "small piece of iron" found during Varley's other prewar excavation on a Cheshire hillfort, that of Maiden Castle, Bickerton (Varley, 1935; 1936; Varley and Jackson, 1940, 69), lack of information in the report and scarcity of associated artefacts precludes the extraction of any useful information. The results of Fox's investigations at the sandhills site of Merthyr Mawr Warren, Glamorgan, which produced a fragment of so-called "Early Iron Age" slag, are scarcely more illuminating (Wheeler, 1925, 202-3; Fox, 1927; Savory, 1952-3), the "mounds" having yielded a plethora of unstratified finds as diverse in form and date as those from the Cold Kitchen Hill, Wilts. midden discussed above, thus precluding a precise date being assigned to the slag therefrom, while the results of Savory's excavations at Twyn-Llechfaen hillfort, Brecknock. (Longworth, 1960, 360; Savory, 1961) are equally unhelpful owing to the undiagnostic nature of the associated pottery, lacking as it does both rims and decoration.

Two pieces of evidence remain to be discussed, that of the looped socketed axe from the Berwyn Mountains, Merioneth and the iron reputedly used in the manufacture of the Mold (Flints.) petrel. Little

has been deduced about the date of the former find (Arch. Camb., 1855, 250-2; Rainbow, 1928, 173; Grimes, 1946, 68), the circumstances of its discovery being unknown, its location being described merely as "from the summit of the Berwyn Mountains" and its form being as typologically unhelpful as that of the other examples described in this study. As for the second, the report that iron formed part of the stiffening of the famous gold cape from Bryn Ellyllon (Flints.; *Archaeol.*, XXVI, 425) proves on examination to be spurious; on the contrary, the backing is of copper and the "corrosion" which led to the above identification merely cuprous.

THE UPPER AND MIDDLE THAMES VALLEY AND THE CHILTERN

It cannot be claimed that the next area to be considered, comprising on the one hand the chalk ridges of the Chilterns and the Berkshire Downs and on the other the low-lying areas of the Middle Thames Valley, the Berkshire river gravels and the Upper Thames Basin (bounded on the north by the limestones of the North Oxfordshire Heights and to the east by the claylands of the Vale of Aylesbury), constitutes an entity on archaeological or geographical grounds, encompassing as it does both cultural and topographical diversity; nevertheless, it is treated here as such purely to facilitate the citing of metallurgical and ceramic comparisons in the formation of the chronological sequence.

Care must be taken, however, to ensure that use of such a convenient, but artificial, unit does not obscure two vital features; first, the imbalance in our understanding of the later prehistoric settlement patterns and artefactual sequences of the area, and, second, the possibility of the existence of a variety of such patterns therein. With regard to the first factor, topographical and geological differences, as well as those relating to agricultural and commercial practices, have occasioned variation in the survival and discovery of archaeological remains in this area (see chiefly Benson and Miles, 1974; Gates, 1975), while an imbalance in resources and manpower has further affected the pattern; thus, while the Upper Thames Basin has had the benefit of the attentions of those who study in, or are employed by, the various academic institutions and archaeological groups based in Oxford – the antiquarians of the mid-nineteenth century, the staff of the Ashmolean Museum, the Oxford University Archaeological Society, the Oxford Excavations Committee, the Upper Thames Archaeological Committee and, most recently, the Oxford Archaeological Unit, not to mention the

numerous aerial investigators - the cultural backwater of the Middle Thames Basin on the other hand has been comparatively neglected, at least until the formation of the Berkshire Archaeological Unit in 1975 and the recent increased involvement in local survey and excavation of the Department of Archaeology at Reading University. Examination of the later prehistory of the Chilterns has fared even worse; in his important survey of the Pre-Belgic Iron Age of the area published as recently as 1971, Saunders wrote that,

"[it] was ignored by Dr. Kenyon in her survey of Iron Age 'A' in Southern Britain, owing to the lack of published material, and the most recent survey of the evidence is a chapter in J.F. Head's general survey of the archaeology of South Buckinghamshire"

[published in 1955:] (Saunders, 1971, 3)

while most of the evidence discussed below is derived from excavations of over twenty years ago, and is of limited value.

As will be evident, the format of this section differs from that used hitherto, and some explanation of this alteration is deemed necessary. The omission of both the primary and the secondary catalogue, and the substitution of a gazeteer and accompanying maps, is occasioned by the difficulty of isolating those pottery types current between the eighth and sixth centuries B.C., a task which has been possible in other areas. Recent excavations in the area have failed to facilitate the subdivision of the eighth to fourth century ceramic sequence, as the following extracts demonstrate. Lambrick, writing in 1979, concludes his discussion of the Iron Age pottery from Farmoor, Oxon. with the opinion that

"the accurate dating of Iron Age pottery on purely stylistic grounds remains very difficult in the Oxford area, despite the work on typology and the excavation of a site with a stratified sequence of groups. The broad outline of three basic periods, the old A, B and C, remains fixed, but within these the subdivisions are still fairly fluid, and the whole system needs to be tied to an absolute time-scale".

(1979, 38)

The latter has, however, proved difficult to establish, the radiocarbon dates from the site at Ashville, Abingdon (Oxon.) have been described as "unfortunately inconsistent", while Lambrick has written despairingly of those from Farmoor;

"The samples from F 1007 and F 1053, if the dating and the pottery associations were to be relied upon, would clearly create serious problems for the currently accepted chronology of Iron Age pottery, actually reversing the present sequence".

(Lambrick in Lambrick and Robinson, 1979, 38)

Furthermore, in so far as it is possible to pinpoint earlier types within the broad "decorative tradition" of the eighth-fourth centuries B.C. - and it must be stressed that the attempt made below is both highly individual and tentative - it would appear that the earliest iron-work or evidence of ferrous metallurgy is associated with the putative "developed decorated" ceramic tradition (6th-4th centuries B.C.), later than the earliest instances from the regions hitherto examined. Thus for both these reasons, namely the impossibility of distinguishing a narrow eighth-sixth century ceramic tradition with any precision and the apparent lack of synchronism with other regions, it seemed prudent to discuss the evidence for the earliest occurrence of iron in this area in a manner which accommodates such uncertainty and permits consideration of a greater swathe of evidence.

The ordering and dating of pottery types prior to the decorative tradition of the eighth-fourth centuries is, however, more straightforward, owing to the existence of well-stratified settlement sequences, reliable and abundant radiocarbon dates and secure metalwork associations, and a brief outline of this sequence must first be given. As in the case of the regions already examined, a tradition of "plain ware" vessels, comprising jars with high rounded shoulders and simple plain rounded rims, hook-rimmed jars, wide-bodied squat round-shouldered jars, fine but undecorated bipartite bowls and cups, all of which evince minimal decoration save that of rippling, smearing and smoothing on external surfaces and occasional finger-tipping, both overlaps with (viz. Pingewood, Berks.; Barrett, 1980a, 307) and succeeds, late Deverel Rimbury types; such vessels have been recovered from the sites listed below and shown on Map 7¹, while the radiocarbon dates listed below indicate that they were current between the 11th and 6th centuries b.c.

¹ It will be observed both from the above list and Map 7¹ that the Upper Thames Basin is largely devoid of pottery during this period, Chastleton Camp and perhaps also Yarnnton being the only sites to yield such material. Such a dearth of pottery would, however, seem to reflect the true settlement pattern at the beginning of the second millennium - despite extensive fieldwork, evidence of unenclosed settlements, field systems or Late Bronze Age metalwork is scarce - and attempts should not be made to fill the seeming gap by manipulating the currency of such ceramic types as T-rim jars (see Barrett, 1980a, 308, though dismissed by him), but rather to seek explanations for the settlement shift.

LIST OF SITES PRODUCING PLAIN WARE VESSELS

- Furze Platt, Berks. (Lobb, 1979-80, fig. 3)
- Ballast Hole, Theale, Berks. (Piggott, 1938, 52)
- Cow Down, Grim's Ditch, Berks. (Ford *et al.*, 1982, 21-2, 30)
- Beedon Manor Farm, Berks. (Bradley *et al.*, 1980, 289)
- Rams Hill, Berks. (Barrett, 1975, fig. 3.5)
- Aldermaston Wharf, Berks. (Bradley *et al.*, 1980)
- Knight's Farm, Berks. (Bradley *et al.*, 1980)
- Puddlehill I, Chilterns, Bucks. (Matthews, 1975; Saunders, 1971, 4, fig. 2)
- Terrick, Bucks. (Saunders, 1971, 6)
- Maidenhead, Berks. (Barrett, 1979a, 231, fig. 1(i))
- Chastleton Camp, Oxon. (Leeds, 1931a, fig. 6.7.382-98)
- Hartigan's Gravel Pit, Bucks. (Green, 1974, 12-3)

RADIOCARBON DATE LIST FOR PLAIN WARE TRADITION

Rams Hill, Berks. (Bradley and Ellison, 1975, 35-8)

Har 197	1060 \pm 70 b.c.
Har 461	1030 \pm 70 b.c.
Har 231	1050 \pm 90 b.c.
Har 230	740 \pm 70 b.c.
Har 229	1010 \pm 80 b.c.
Har 228	1070 \pm 90 b.c.

Hartigan's Gravel Pit, Milton Keynes, Bucks. (Green, 1974, 12-3. P 76f., P 76g.; Barrett, 1975, 104)

Har 339	840 \pm 70 b.c.
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Knight's Farm subsite I, Berks. (Bradley *et al.*, 1980, fig. 52-8, Pit 8 [the association between sample and pottery is tenuous])

Har 1013	1100 \pm 90 b.c.
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Knight's Farm subsite 2: base of Feature 3

Har 2929	1050 \pm 100 b.c.
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Knight's Farm, subsite 3: Feature 181

BM 1597 565 ± 250 b.c.

Aldermaston Wharf, Berks. (Bradley *et al.*, 1980)

BM 1590 1050 ± 40 b.c. Pit 68

BM 1591 835 ± 35 b.c. Pit 68

BM 1592 1290 ± 135 b.c. Pit 6

Indeed, it may even be possible to subdivide this plain ware tradition into an "earlier" and a "developed" phase (as is the case in the lower reaches of the valley, viz. the assemblage from Runnymede Bridge site I; Longley, 1980), the later, ninth-eighth century B.C., phase being distinguished by increased use of decoration on certain of these vessel forms. Such a sub-group might include the shouldered bucket jars with fingernail ornament both along and beneath the rims exposed during quarrying at Totternhoe, Beds. in 1937 (Hawkes, 1940b), associated with a bronze vase-headed pin, the currency of which (if that from a Wilburton assemblage at Fenny Bentley, Derbys. is properly regarded as an aberrant form) lies in the Ewart Park industrial phase (O'Connor, 1980, 201; Needham, 1980b, 21), sherds found as surface finds at Blewburton Hill, Berks. (Bradford, 1942a, Fig. I, 4; 2, 34, 25; 3, 47) and the majority of the pottery from Ivinghoe Beacon, Bucks.¹ (Cotton and Frere, 1968, figs 17-20), an assemblage which displays marked similarities with that from Runnymede Bridge I (viz. the occur-

¹ Caution must be exercised in interpreting the evidence from this site. First, it must be pointed out that, *contra* Cunliffe, 1978a, 37, and several other authors, the Ewart Park metalwork from the site - the assemblage being interpreted here as such, the only Wilburton items being the studs fig. 10, nos. 2 and 4 - was not associated with the pottery and thus should not be used as a direct means of dating the latter. Second, it should be noted that the phasing of the site suggested in the report is open to reinterpretation with the result that an "earlier" plain ware group can now be distinguished, not simply stylistically but also stratigraphically from the assemblage described above (see Cotton and Frere, 1968, fig. 16).

rence of heavy flint gritting on the bases of several of the pots, the percentage of decoration and the forms themselves - wide bodied, squat, round-shouldered jars, biconical forms with short everted rims and small open-mouthed bowls).

The application of decoration to a greater range of vessels, using a wider variety of techniques, characterises the ceramic assemblages which succeed those of the plain ware tradition. While shouldered jars and bipartite bowls still dominate assemblages, finger-impressed or slashed decoration is now to be found on the necks, rims, shoulders, bodies and cordons of coarse ware vessels, and fine wares evince haematite coating, linear incised decoration infilled with white paste, furrowing, incised hatched triangles, impressed circles and linear or curvilinear incised patterns. Indeed, the "tradition" - if it can be so termed - embraces such a wide variety of forms and styles as to cause numerous problems in classification and relative dating, a point to which we will return below. Dating its advent is, however, relatively simple; assemblages are found in contexts stratigraphically successive to those containing plain ware vessels at Rams Hill, Berks. (Piggott and Piggott, 1940, fig. 5, 1-21; Barrett, 1975) and Knight's Farm, Berks.

The excavators' argument that the occupation of the hillfort is contemporary with its defences is clearly spurious, especially when it is realised that their evidence for the "narrowing" of the rampart - and, by extension, its contemporaneity with the posthole structure - is based merely on the "average" distance between two sets of two postholes. Scrutiny of the report further suggests the existence of an earlier (unenclosed?) settlement prior to the defended phase, features from which survive only in the protected area of level ground behind the rampart and which were destroyed by, or missed during the excavation of, the rampart (*ibid.*, 190) which ran, moreover, at the point where the hill begins to slope more steeply. It is possible also that the round house may have preceded the rampart, but this contention cannot be checked due to the lack of stratigraphy in the interior.

subsites 1 and 3 (Bradley *et al.*, 1980, figs 34-6), and furthermore a group of fine ware bowls and decorated jars from a pit on the latter site was associated with charcoal which yielded the following radiocarbon dates:

Har 1011	740 \pm 80 b.c.
Har 1012	600 \pm 80 b.c. ¹

Metalwork associations are also helpful; while it is prudent to avoid claiming an association between the Carp's Tongue bugle-shaped object and the decorated sherds found in the vicinity of the Neolithic long barrow at Wayland's Smithy (Atkinson, 1965, 132-3), however "tempting" (*pace* Barrett, 1980a, 308) this may appear, the association from Wallingford, Berks. of shouldered jars decorated with diagonal slashings and pie-crust rims with a tanged chisel, socketed sickle and fragments of a pegged socketed spearhead, a seventh century B.C. assemblage, is secure (Collins, 1948-9; Wymer, 1960; Ehrenberg, 1977, Appendix II, 59-60). Sites containing similar, and hence putatively contemporary, assemblages are listed below and shown on Map⁸; as in the preceding period, the sparsity of settlement in the upper reaches of the river contrasts markedly with the density occurring in the middle, and, as we shall shortly see, the lower, reaches, a pattern requiring consideration in due course.

¹Analysis of the grit inclusions of vessels in this pit group revealed that they were composed of haematite although none of the sherds were coated with such slips. The results are contained in Appendix III.

LIST OF "EARLY" DECORATED HORIZON ASSEMBLAGES

Rams Hill, Berks. (Barrett, 1975; Piggott and Piggott, 1940, fig. 5, 1-21)

Lowbury Hill, Berks. (Atkinson, 1916, Pl. XVIII, 18)

Wayland's Smithy, Berks. (Atkinson, 1965, 132-3)

Wallingford, Berks. (Collins, 1948-9; Wymer, 1960)

Knight's Farm, Berks. (Bradley *et al.*, 1980)

Churn I, Grim's Ditch, Berks. (Ford *et al.*, 1982)

Appleford, Oxon. (Hinchliffe and Thomas, 1980)

Standlake, Oxon. (Bradford, 1942c, 202-14)

Bampton, Oxon. (Harding, 1972, Pl. 46A)

New Wintles Farm, Oxon. (Harding, 1972, 80-1, Pl. 49)

Kirtlington, Oxon. (Harding, 1966, 158-161, fig. 14)

Wittenham Clumps, Berks. (Hingley, 1980, figs 8-15)

Cop Round Barrow, Bledlow, Bucks. (Head, 1938)

It is in attempting to order the sequence of this decorative tradition and define its end that the principal problems arise. In the seventies it was customary to regard the fifth century as a "horizon of innovation" (following the work of Harding, 1972, 86-96), that being the point at which jars and bowls, distinguished by markedly angular profiles, with sharp shoulders and upright or outward flaring rims, allied to the Continental Early La Tène vases carénés, were thought to have appeared. The results of recent excavations, most notably those at Runnymede Bridge, Surrey, Aldermaston Wharf, Berkshire and Knight's Farm, Berkshire (Longley, 1980; Bradley *et al.*, 1980) have, however, altered this view, for it can now be shown that most of the traits defining the angular pottery tradition were available in ceramic repertoires from the ninth century B.C. onwards, and that it

is rather to Late Urnfield - Hallstatt assemblages that we should look for enlightenment. Barrett's words quoted below summarise currently-held attitudes:

"Harding's La Tène 'horizon' of angularity can embrace a wide group of chronologically diverse material. It cannot be used as a clear chronological horizon, as it does not exist, let alone as an indicator of Marnian influence in the Southern British Iron Age".

(Barrett, 1978, 286)

Let us examine the argument in more detail. It is indeed true that forms and decorative techniques hitherto regarded as dating from the fifth century B.C. occur in assemblages from the ninth century B.C. onwards in the Thames Valley. Bipartite jars, some with sharply angled shoulders, are to be found at Ivinghoe Beacon, Bucks. and Puddlehill, Beds.; high shouldered jars with tall upright or slightly flaring rims and finger-tip decoration, so typical of the Long Wittenham and Allen's Pit assemblages, can be shown to lie in the bucket jar tradition, their antecedents being Hallstatt B/C vessels from the Low Countries (Longley, 1980, 73), and decorative motifs such as incised hatched triangles, impressed circles, dots and linear patterns can be found amongst the late plain ware material from Ivinghoe Beacon, amongst the Puddlehill I assemblage and on the "early decorated" material from Rams Hill, Berks. (Cotton and Frere, 1968, figs. 17-20; Saunders, 1971, fig. 2; Barrett, 1975, fig. 3.6). Furthermore, while expanded and T-shaped rims occur in contexts which contain late Hallstatt round-bodied bowls or pedestal-based vessels (e.g. at Mount Farm and Chinnor, Oxon.), or with tripartite decorated bowls (as at Ashville, Oxon., there associated with a radiocarbon date of 520 ± 70 b.c. : Har 1247), they are also found in plain ware assemblages (Saunders,

1971, fig. 2.20; Cotton and Frere, 1968, esp. fig. 17); rather than viewing these as sensitive chronological indicators, or investing them with an importance far beyond that of the body forms to which they are attached, so that the latter have, uniformly, to resemble ceramic versions of bronze vessels (with all the chronological difficulties such an argument entails), they should simply be seen as one of a variety of forms - or, more helpfully, of constructional techniques - which occur alongside, and are of no greater significance than, flat-topped, pie-crust, beaded or bevelled types, and weighted accordingly in our analysis of traits.

Having dispensed with a useful chronological horizon in the fifth century and accordingly being left with nothing more than a pool of ceramic traits current from the ninth century B.C., how then can any ordering of Early Iron Age pottery in the Thames Valley be achieved? For it is now possible to point to ninth-eighth century examples of any of the vessel forms which occur in such assemblages as Allen's Pit, Oxon., Long Wittenham, Oxon., Mount Farm, Oxon., Ashville, Oxon., Stanton Harcourt, Oxon. and Farmoor Oxon. - be they high shouldered jars, angular bipartite vessels, barrel-shaped jars or types of rim form and decoration. Thus Barrett has argued for an early date for the pit material from Mount Farm, Oxon. as follows:

"One Class I jar (3) is closely comparable to a vessel from Linford, Essex (Barton, 1962, fig. 1, g) from Pit G2 on that site, and, further afield, at Mount Farm, Dorchester, Oxfordshire. from pit μ on that site (Myres, 1937, fig. 8). Although not closely datable within themselves these assemblages probably date to between the eighth and sixth centuries B.C."

(Barrett, 1978, 278)

It is by not adopting this approach, however, by not concentrating on individual vessel types, that the key to the ordering of this mass of material lies; rather it is the proportion of vessel types that is important, requiring the assessment of entire assemblages. For it would appear from the published evidence - and the accounts of the recent excavations at Mount Farm are sorely needed, especially since those others conducted by the Oxfordshire Archaeological Unit cited above have helped but little to clarify the Early Iron Age sequence - that there is a trend towards assemblages which contain a larger proportion of angular and barrel-shaped vessels, and which evince a wider variety of expanded rim forms and a less extravagant use of finger-tipped decoration than those listed above. Thus, the assemblage from the phase I pits at Farmoor, Oxon. (Lambrick, 1979, 39-43, fig. 21) comprised mainly angular jars, shouldered vessels and barrel-shaped jars and that from the phase I pits at the multi-period site at Ashville, Abingdon, Oxon. (De Roche in Parrington, 1978, 47-50) mainly angular vessels, slack shouldered coarse ware jars and vessels with expanded rim forms; further similar assemblages are listed below.

Allen's Pit, Oxon. (Bradford, 1942b)

Long Wittenham, Oxon. (Savory, 1937, fig. 2)

Radley, Oxon. (Leeds, 1931b; 1935)

Mount Farm, Oxon. (Myres, 1937, fig. 6, 7 and 8)

Bledlow, Bucks. (Head and Piggott, 1946)

Puddlehill, phase 2, Bucks. (Saunders, 1971, 9-17)

Frilford, Berks. (Bradford and Goodchild, 1939)

Stanton Harcourt, Oxon. (Williams, 1951; Hamlin, 1966)

Wytham, Oxon. (Bradford, 1942b, fig. 12, 21-35)

Pitstone, Bucks. (Waugh, 1968, in Cotton and Frere)

Ellesborough, Bucks. (Cocks, 1909)

As for the date of these assemblages, it is impossible at present to offer more than a tentative suggestion given the current lack of well-stratified assemblages - so much of the material derives from discrete pit groups, the stratigraphic relationships of which are ignored now just as much as they were, through lack of awareness, in the past - the paucity of associated metalwork and the scarcity of reliable radio-carbon dates (see above). Parrington (1978, 72) and Lambrick (in Lambrick and Robinson, 1979, 37) have, however, convincingly argued that Phase I on their respective sites begins in the sixth century B.C., and hence it is this date which ought to be applied to the advent of our "developed decorative tradition" at present. Defining the end of the tradition is equally difficult, especially in view of the long currency of finger-tipped coarse wares and the existence of such single "late" dates as that from Knight's Farm, Berks.¹; it should, however, be placed at that point when pedestal bases are added to certain forms of fine ware bowls.

As stated above, one of the reasons for adopting a different format in discussing the evidence from this region is that the earliest iron herein seemingly occurs in the sixth century B.C., a late initial date compared to that proposed for the material already reviewed; factors affecting the validity of this hypothesis will later be discussed, but first the evidence on which it is based must be examined.

¹ Knight's Farm, Berks. subsite 3: F 106 (33)

Bradley *et al.*, 1980, 274

BM 1595 : 290 ± 120 b.c.

Angular vessel, shoulder decorated with finger-tip impressions.

While several instances of the occurrence of iron in pre-sixth century contexts have been cited in the literature, scrutiny of the relevant reports reveals these claims to be spurious or based upon insufficient evidence. The earliest putative instance is that from the Yattendon hoard, Newbury, Berkshire (Evans, 1879, 480-5; Coghlan, 1970; Burgess, Coombs and Davies, 1972, 236), a find related to the Broadward industrial complex but containing such Carp's Tongue types as a fragment from ^{the} eponymous sword type and a South-Eastern socketed axe. In his original report Evans recorded:

"On what seems to be a socket broken off from a spearhead there is at the broken end a thick encrustation of rust of iron, with impressions on it apparently of other sockets of spearheads ... Assuming that the oxide of iron already mentioned is the result of the decomposition of some article formed of that metal and not merely of the accidental presence of a piece of iron pyrites, or of a nail connected with the beacon (a later monument on the hill nearby) this circumstance would also give evidence in favour of a late date being assigned to this deposit".

(Evans, 1879, 483-4)

An enquiry into the validity of this claim, however, produced the following repudiation from the late H.H. Coghlan, erstwhile Curator of Newbury Museum in which collection the hoard now resides; his reply is quoted *in extenso* so as to remove all uncertainty, clarification of the contents of the four currently accepted "bimetallic hoards" being considered to be one of the primary tasks of this study.

"The environment in which the Yattendon hoard was found is a particularly nasty and corrosive one, and when I received the hoard in the museum all the bronzes were encrusted with a sticky clay, and no doubt other matter mixed in. I had much difficulty in cleaning most of this deposit off and I did not find any thick encrustation of what Evans refers to as iron rust on any of the objects. I am sure

that the rust-staining, if any, must have come as you suggest from dilute iron-pan. I have frequently noticed traces of iron-panning in the geological formations around and near to Newbury. One may safely say that no authentic iron objects were associated with the Yattendon hoard".

(Coghlan in litt.
21st Feb., 1981)

Two further claims rely upon the existence of firm associations between the ironwork and early decorated horizon pottery being demonstrated - but in both cases this is impossible; the context of the tanged iron knife "from a pit" from Standlake, Oxon. (Leeds, 1935, 30: pl. IV, fig. 1), a site which produced such pottery (Harding, 1972, 83-4), cannot be determined more precisely owing to lacunae in Stone's report, nor can the association between a lump of iron slag and one such sherd from Feature 12 on site III at Aldermaston Wharf, Berks. (Cowell, Fulford and Lobb, 1978, 21)¹. As for the date of the single-edged iron knife and slag from among hearth material on the old land surface under the primary rampart at Blewburton Hill, Oxon. (Collins, 1952-3, 51) this is equally difficult to determine. An early palisaded phase of occupation prior to that defended by the box-rampart was recognised both in the later campaigns (Harding, 1976b; early decorated types including furrowed bowls, chevron ornamented sherds and finger-tipped coarse wares being found on the old land surface under the box-rampart and in the interior) and in the earlier (represented by later plain ware types and early decorated material on an old land surface beneath rampart I: Collins, 1947, 28), and though dated

¹ It should be noted that further slag occurs in a neighbouring feature associated with 1st century tile.

to the seventh century in 1976 can now be seen to be earlier; since the iron objects derive from such an occupation layer it would seem appropriate to date them accordingly. Unfortunately, the earlier excavator also reports the finding of cordoned haematite bowl sherds on the pre-rampart turf-line in cutting F (Collins, 1952-3, 45); while it is reasonable to suggest, in the absence of finer stratigraphic detail, that these sherds rather belong to the infill of the palisaded phase and should thus be assigned to the box-rampart constructional phase associated with round-bodied bowls, coarse ware jars with expanded rims and cable ornament, and jars with S-shaped necks and rosette patterns, it has to be admitted that the evidence as it stands suggests that the palisaded phase was of long duration and that the iron may equally be contemporary with the later, cordoned haematite, pottery.

One final instance has to be omitted on the grounds of stratigraphic uncertainty, that of the iron blade from an occupation site at Wittenham Clumps, Berks., excavated by Rutland in 1970, these campaigns having recently been re-assessed by Hingley (Hingley, 1979-80). Here an assemblage of early decorated ware was recovered from Layer 3, the "dark occupation layer", now succeeded by a layer of lighter soil which contained Romano-British artefacts; Hingley, however, remarks that owing to heavy plough damage on the site it is impossible to surmise the depth of occupation deposit lost before the build-up of the Medieval-modern lynchet (layer 2) and that it is likely "that Middle Iron Age occupation consisting of shallow features excavated into the top of a thick layer of domestic refuse could have been totally removed by later ploughing" (Hingley, *ibid.*, 52). Since the location of the ring-headed pin (presumably of iron by the way in which it is illustrated, but simply described as "metal") is given as "from the top of the dark occupation

occupation layer" (layer 3, trench J), it is reasonable to suppose that it post-dates the decorative ware and may possibly have been associated with this putative Middle Iron Age phase of occupation. The location of the iron blade, however, is only described as being "from the dark occupation layer in Trench J"; thus while it may indeed have been associated with the early decorative tradition pottery, such a date cannot be conclusively proved and for this reason the find must be relegated to the category of doubtful evidence.

The earliest securely dated ironwork and evidence of iron metallurgy appears to be associated with the pottery which, it was argued above, dates to the sixth to fourth centuries B.C., our "developed decorated wares", as can best be demonstrated by two recently excavated sites, Ashville, Abingdon, Oxon. (Parrington, 1978) and Farmoor, Oxon. (Lambrick and Robinson, 1979). At the former, a multi-period site dating from the Bronze Age to the Later Iron Age and excavated in advance of redevelopment in 1974 and 1976, ironworking débris in the form of forging slag was associated with a series of pits which produced an assemblage of pottery dominated by globular jars, angular vessels, slack shouldered jars and vessels with expanded rim forms. Two further pits (F60 and F313) evinced signs of burning (viz. charcoal and burnt clay) and were thought to be metallurgical hearths either for the heating and final working up of semi-finished iron artefacts, or for the melting of bronze alloys (a crucible and bronze slag having been found in features F129 and F157):

Likewise, at Farmoor where the earliest Iron Age occupation, consisting of a group of shallow pits set discretely on a rise on the gravel terrace

and removed from the main enclosure, and which yielded a similar ceramic assemblage to that from Ashville Phase 1 (Lambrick and Robinson, 1979, 19 and 65), included two features which may be interpreted as iron roasting or smithing pits on the basis of the slag and layers of burnt clay found therein (F 1055 and F 1013, respectively); as at Ashville, no iron artefacts were found which can be dated to this early phase. Parrington has compared the Phase I pottery from Ashville with material from Long Wittenham, Allen's Pit and Mount Farm, Oxon., and it is interesting to note that the latter two sites also contained iron slag (Case *et al.*, 1964/5, 43; Myres, 1937.21); further contemporary assemblages, but from the Chilterns, have yielded a small tanged knife, a ring-headed object and fragments of iron rings (Puddlehill, Bucks., Saunders, 1971, 15; Pitstone, Bucks., Saunders, 1971, 15). Saunders would ally the unenclosed site of Chinnor, Bucks. to this group (Richardson and Young, 1951) which yielded three iron ring-headed pins, three tanged knives, an iron ring and wire; consideration of this material, however, lies outside the present study, the presence of pedestal bases amongst the earliest pottery from the site - insofar as it is possible to determine stratigraphic relationships at all - being thought to indicate a date late in the developed decorated tradition, as argued above.

It is not my purpose in these subsections to consider the mechanisms behind the adoption of iron or to discuss the relationship between the old technology and the new - that must wait till the concluding section - but merely to list and date the earliest occurrences of iron in each region. In concluding this review of the evidence from the Upper Thames and the Chilterns however, one point requires immediate clarification. Barrett and Bradley have recently argued that the adoption of iron

technology in the Upper Thames Basin is allied to a resurgence in settlement there; having been a prosperous hinterland dominating the peripheral Middle and Lower Thames regions in the Early Bronze Age and having then been eclipsed in importance in the Later Bronze Age as the latter areas "[realised] their own potential in terms both of agricultural production and control of long-distance trade" (Barrett and Bradley, 1980c, 254) the region is seen to have regained its status as a core area at the end of the Bronze Age "facilitated by the acceptance of iron" (*ibid.*, 265) and realigned exchange relationships. The hypothesis, though attractive, rests upon the questionable assumption that the "gap" in settlement in the Upper Thames Basin during the Later Bronze Age shown on Maps ⁷8 and ⁸7 is real rather than the product of decades of eclectic fieldwork.

The biased nature of archaeological distribution maps of this region, arising from the suitability of gravel soils for revealing cropmarks compared to heavier clays, and the intense commercial exploitation of such deposits (in particular to the north of the Thames above Oxford and around Dorchester on Thames; Benson and Miles, 1974, 18) is well-known, but it is only recently in the history of fieldwork that the gaps have begun to be filled in. As Benson and Miles have written:

"One of the most striking results of aerial survey since 1962 has been the discovery of sites along the Thames alluvium, an area previously devoid of cropmarks, and thought to be unsuitable for early settlement. Why these cropmarks have appeared only in recent years is not yet entirely clear, but a major factor seems to be the recent ploughing of once-permanent pasture. On the gravel terraces themselves, there can now be little doubt that the density and distribution of cropmarks are but a bare reflection of the true picture. South of Oxford the "blank" areas of gravel terraces clearly cry out for aerial survey. In short, there is every reason to believe that the Upper Thames

gravels and associated alluvial areas constitute one vast, continuous series of archaeological landscapes".

(1974, 18)

The distribution map of those sites in the Upper Thames region which can be dated to the Later Bronze Age illustrates the problem, for the majority are situated on the lower terraces and flood plain of the Thames or its tributaries, the Evenlode, Kennet and Windrush. Is it not conceivable that we may only be recovering one part of the annual economic cycle, perhaps the summer pasturage, sites which need not necessarily contain Later Bronze Age metalwork and the other small bone and stone artefacts by which we recognise Later Bronze Age occupation¹? It is fascinating to note that among the finds from the 1965-66 excavations at Woodeaton, Oxon. - and I must thank Professor D.W. Harding for showing me the material prior to publication - were a nail-headed bronze pin, a fragment of a shale bracelet, three pairs of tweezers, a possible bronze bracelet fragment, a bronze penannular ring, a worked antler fragment and sherds of shouldered jars decorated with finger impressions and slashing², several of which definitely derive

¹ Controversy rages over the question of the flooding and possible seasonal usage of the Thames flood plain in the Later Bronze Age, with conflicting evidence being cited by the protagonists of the opposing schools of thought (Case, 1963, 51-2; Lambrick and Robinson, 1979, 134; Robinson, 1980, 133-4; Case, 1982a, 1) with some arguing that flood-plain grazing was neither necessary nor acceptable in that period under the intensified and innovatory system of infield-outfield farming, others proving that periodic local flooding was already occurring in the Later Bronze Age and is not simply an Iron Age phenomenon. The most sensible conclusions at this stage are those of Robinson and one can only endorse his final plea that further study be carried out in this field (Robinson, 1980, 134).

² The assemblage is remarkably similar to that found at Cop Round Barrow, Bledlow, Bucks. (Head, 1938); finger-decorated sherds were found associated with a pair of bronze tweezers in a pit and a broken bronze ring, further tweezers, nail-headed pins, a tanged knife and an antler cheek-piece were loosely associated with this material - a typical Ewart Park "small bronze" assemblage.

from the earliest layers on the site; fascinating, because the location of this settlement differs from that of the sites mentioned above, lying above the Clay Vale on an outcrop of Cornbrash (over 122 metres O.D.) east of the Cherwell. If similar locations were to be searched by field-walking and aerial survey, perhaps further sites would be located just as they have on the alluvium as mentioned above, and if the "gap" were proved illusory, then there can be no "resurgence" *pace* Barrett and Bradley. This is not to ignore the effects that the adoption of iron undoubtedly had on the settlement pattern and exchange relationships of this, as of every, region - topics to be examined in the concluding section - but rather as a caution against too ready acceptance of such a seemingly plausible hypothesis.

THE EAST MIDLAND PLATEAU

In contrast to the previous area examined which lacked not only iron resources but also evidence of the metal's use prior to the 6th century B.C., that to be studied next evinces both categories of evidence in plenty, the existence of the latter seemingly being consequent upon the occurrence of the former. The East Midland Plateau, hills one hundred to two hundred metres high, running north-east from the River Cherwell to the Vale of Belvoir, encompasses two major sources of iron ore, both bedded ores of the Jurassic sequence, the first being the Marlstone or Middle Lias horizon in the scarplands between South Lincolnshire and North Oxfordshire, and the Banbury area on the borders of Oxfordshire and South Lincolnshire; iron carbonate ores from these sources are lean, yielding about 25% iron and occur either as surface outcrops or beneath overburden of less than thirty metres. The second source is that of the Inferior Oolite deposits of the Northamptonshire Sands, a field which extends continuously from the Grantham district in South Lincolnshire to near Northampton, and which currently provides roughly 50% of all British ore output, being worked most extensively around Wellingborough, Kettering and Corby; as in the previous case, the iron carbonate ores are easily accessible, give high yields (30-33% iron) and occur in beds of two to four metres thickness.

The pottery sequence of this area is ill-understood, Early Iron Age sites having largely escaped detection from the air (unlike the Middle and Late Iron Age enclosures), and those that are known yielding merely a few sherds in highly fragmentary condition. The assemblage from Weekley Hall Wood, Northants., for example, is described in the following manner:

"The sherds were too small to assess their form and only two sherds of the rim type were present ... None of this pottery is suitable for illustration",

(Jackson, 1976, 80-1)

while sherds from Oakley, Northants., one of the most vital sites in the entire catalogue, were described as being

"small in both quantity and size ... too small to assess the likely forms".

(Jackson *et al.*, 1982, 14)

It would be foolhardy to attempt to establish a ceramic sequence at present prior to the presentation of Knight's thesis and the publication of further material from Gretton (Knight; forthcoming; The Iron Age in the Nene Valley: Jackson; forthcoming) and thus the following discussion merely details the dates and comparanda of existing assemblages.

Assemblages of thin-walled vessels in corky fabrics - bipartite bowls and jars with simple, rounded, flattened, hooked or internally bevelled rims and surfaces lacking both decoration and burnishing - have recently been recovered from the sites of Greak Oakley, Corby and Weldon in North Northamptonshire¹, discovered during ironstone mining, excavated by the Northamptonshire Archaeological Society under the direction of Denis Jackson and published to an exceedingly high standard by the latter in the Journal of that society; the thin-walled construction, resemblance to the pre-palisade assemblage from Rams Hill, Berks., and lack of decoration of the sherds from Corby -

¹A further assemblage is reputed to have come from a pit on the site at Harringworth (Jackson, 1981, 14; Jackson *et al.*, 1982, 21).

only two evince decoration, one with finger-nail impressions on the shoulder, the other with closely-set parallel lines on the surface - suggest that these should be attributed to the plain ware tradition. Only two radiocarbon determinations, both from Oakley, have been recovered from material associated with this type of pottery, but one, Har 4064, 550 ± 80 b.c., derives from a bulked sample from two widely separated features, and accordingly should be treated with caution; the other, Har 4494, 680 ± 100 b.c., came from charcoal in a reliable context in Pit F9 in structure 2 (area 1), securely associated with the pottery. The excavator's interpretation of these dates is as follows:

"When calibrated according to the curve of Clark (1975), these dates become $865 + 100 / - 95$ B.C. and $755 + 80 / - 140$ B.C. at the 68% level of confidence (Har 4494 and Har 4064, respectively). These results are not statistically separable, and it seems therefore legitimate to suggest a date of around 800 B.C. for the occupation of the site or sites at Oakley".

(Jackson *et al.*, 1982,
5-6)

Since it seems wiser to use only Har 4494 for the reason stated above, we are thus forced into the unsatisfactory position of having to date an entire pottery tradition on the basis of a single determination; the suggestion that the plain ware tradition in this region lasted into the eighth century is thus made with extreme caution and must be viewed accordingly.

Dating the advent and currency of the succeeding decorative tradition in this region is not easy owing to the lack of reliable associations, the only site affording a stratified sequence combined with radiocarbon dates and secure metalwork associations being that of Rainsborough, Northants., a bivallate hillfort near Charlton, Newbottle, excavated by

Avery and the Oxford University Archaeological Society between 1961 and 1965 (Avery *et al.*, 1967). The report is exceedingly detailed, so much so that the reconsideration of the phasing and dating of the site made necessary by advances in typology and the publication of radiocarbon dates can be carried out with ease. The original report placed the occupation of the site prior to the construction of the defences in the 6th-5th centuries B.C., but a date in the Later Bronze Age can now be suggested. The pottery¹ from this early, probably palisaded, settlement which derives from sealed and unsealed contexts on the old land surface beneath the inner bank (AI/1B (15) and post-hole 1 - Pl. XVIII A; K/16 - Pl. XVIII C; T1/(8) - Pl. XX A), from beneath the rear wall of the inner bank (S₂/S(24) fig. 9. S₂) and from the first roadway and contemporary old land surface of the north and south guardrooms (R/(25) - Pl. XXI A), comprises shouldered jars with flaring or concave necks and bipartite bowls, both with simple or slightly flattened rims and displaying a restrained use of decoration (chiefly finger-printing and stamping on shoulders); fabrics are sparsely tempered with finely pounded shell and surfaces display slight burnishing (fig. 19; 14-15: fig. 20; 16-18: fig. 26; 82-87: fig. 30; 152: fig. 33; 185-187). Such vessels should probably be placed at the beginning of the decorative tradition, a date which is consistent with that of the only piece of associated metalwork, a finger-ring of hammered strip bronze (fig. 33.187 from T1(8)). In the original report it was alleged that since such rings do not occur in Late Bronze Age deposits (only those of wire or rod bronze), this example "should postdate these

¹The following discussion includes only the stratified material, roughly 30% of that illustrated, and therefore excludes furrowed bowls nos. 33 and 34 from B (Pit 1).

deposits as therefore will the construction of the fort" (Avery *et al.*, 1967, 290); examples are however known, one such coming from the Ewart Park deposit at Heathery Burn, Co. Durham (Inv. Arch., G.B. 55, 10(1) no. 12) and thus the prefort occupation can be back-dated considerably, to the ninth-eighth centuries B.C. A *terminus ante quem* for such pottery is provided by two radiocarbon determinations from timbers used in the construction of the guard-room rooves (UB 737) 540 ± 35 b.c. and (UB 853) 480 ± 75 b.c., and which should thus relate to the primary occupation of the fort; only seven securely stratified sherds relate to this horizon (from on and above the lower cobbled road R24 and R23, Pl. XXIA; from the occupation debris beneath the remake of the northern guard-room floor R21: Pl. XXIA, and from the charcoaly organic occupation material underlying the renewed floor of the southern guard-room R16: Pl. XXIA), and these are, in the main, too undistinguished to allow ceramic comparisons to be drawn¹ - regrettably, since it is in this phase that the first iron objects occur.

Further early decorated tradition assemblages have been recovered from the sites of Weekley Hall Wood (Jackson, 1976, 80-2, fig. 6.1), Ringstead (Jackson, 1978, 168, fig. 1), Ecton (Jackson, 1973, 31-8) and Park Lodge Quarry, Gretton, Northants. (Jackson, 1974b, fig. 17, 1-8), but these offer little in the way of associated dating evidence; the sherds from the silted-up barrow ditch at Ecton may have been associated with a typologically early bronze ring-headed pin suggesting a sixth century B.C. date (Jackson, 1973, fig. 5(iii)), as may those

¹Two sherds display incised zig-zag decoration, a third forms a flattened rim.

from Gretton, but in the latter case not only is the association dubious¹, but so also is the typological ascription. The much larger but still unpublished assemblage from more recently discovered features on the same site, probably representing unenclosed settlements aligned along a trackway or boundary, is more helpful; shouldered jars and carinated bowls decorated with finger-nail incisions and imprints on rims and shoulders with simple, flattened or slightly expanded rims and flat or footring bases, were apparently associated with radiocarbon dates centred on the mid-5th century b.c. (Jackson *et al.*, 1982, 20), suggestive of a similar date. The assemblage from the rectangular enclosure and pits at Briar Hill, Northants., claimed to belong to this phase, ought however to be discounted, as it is more likely to be of Late Neolithic - Early Bronze Age date (Jackson, 1974b, 24-6, fig. 9).

The pottery from such sites as Wakerley (Jackson and Ambrose, 1978), Harringworth (Jackson, 1979b, 102; 1981, 14-33) and Wellingborough (Foster and Harper, 1975, fig. 2, 1-11 and fig. 3, 1-10) would seem to belong to a later phase of the decorative tradition than the assemblages described above, thereby preventing the inclusion of a valuable body of ironworking evidence in the catalogue. That from the first site, associated with slag in Ditch C1 (fig. 36, 1-10) consists of shoulderless vessels with upright or inturned rims and barrel jars; finger-print or nail decoration is absent but widely spaced vertical scoring occurs, a trait which only originates in assemblages of the 5th-4th centuries B.C. in Eastern England and which is first found in Northamptonshire on vessels associated with third century b.c. radiocarbon dates (Jackson,

¹The relationships of Pit F41, from which came the pin, with the remainder of the pit alignment, is unclear (Jackson, 1974b, fig. 16).

1975 , 73). The closest parallels to the assemblages from Weaver's Road and Ruskin Avenue, Wellingborough and that from ditches C and D at Harringworth - the latter also yielded iron slag - in which the dominant form is that of the round-bodied jar with short everted neck displaying lightly scored surfaces and lacking the finger-tipped or carinated forms evident at Gretton, are to be found in the Pitstone, Bucks. assemblage (Waugh, 1968, 235-48), which Saunders places late in his Phase 2 horizon, and should therefore date to the late 5th or 4th centuries.

PRIMARY CATALOGUE

CORBY, Northamptonshire

SP 863 896

Traces of Iron Age occupation discovered in 1974 during housing redevelopment to the south and south-west of Corby New Town; limited excavations in two locations were carried out during that year. Area 2, which is of concern here, comprised three ditches and scattered features. An assemblage of 195 plain ware sherds was recovered, mainly from Ditch A, which also yielded pieces of iron slag - both of which are discussed in the text; the only other material found was a quantity of animal bone. A few contemporary sherds were found in the lower silts of a D-shaped ditched enclosure in Area 1, but the majority of pottery from that site dated to the Middle and Later Iron Age.

Bibl.: Jackson *et al.*, 1982.

GREAT OAKLEY, Northants.

SP 881 866

Removal of topsoil prior to ironstone quarrying in 1976 at a site 1.5 kms north-east of Great Oakley village and c. 1 km from the outskirts of Corby revealed Iron Age features; limited excavations were carried out in that year and again in 1978 following further stripping. Excavation revealed two subsites separated by a shallow north-south running valley, the first comprising two semi-circular structures and surrounding pits, the second merely pits, postholes, quarry scoops and occupation débris in the form of charcoal, flecked loam and pottery. Charcoal from a pit in area 1, F9 (which also yielded sherds of the type discussed in the text), provided a date of 680 ± 100 b.c. (Har 4494) while a bulked sample from two pits in area 2 (28 and 29) gave a determination of 550 ± 80 b.c. (Har 4064). The furnace, described at length in the text (SP 882 866) was sited in the valley just south of areas 1 and 2 next to a former watercourse; contemporaneity with the occupation is alleged on the basis of the existence of a piece of cinder in the fill of the gully at the north-east corner of structure 1 (area 1, which incidentally yielded neither pottery nor radiocarbon date but is thought to be contemporary with structure 2) and that of a piece of slag in Pit F22, area 2. No further small finds nor animal bones were recovered.

Bibl.: Jackson, 1979c, 103.
 Jackson *et al.*, 1982.

WELDON, Northants.

SP 922 889

Topsoil stripping prior to ironstone quarrying in Weldon revealed two shallow pits, one of which, Pit 1, contained 64 sherds of plain ware pottery, burnt stones and iron slag. Pit 2, thirty-five metres to the

west of pit 1, was filled with brown sandy soil and charcoal, but yielded no finds.

Bibl.: Jackson *et al.*, 1982.

DISCUSSION

The importance of the East Midland plateau area in an investigation of the adoption of iron in the British Isles stems from the three sites listed above, in which evidence of ironworking is to be found apparently associated with pottery provisionally dated to the eighth century B.C.; of the three, the most informative is that of Great Oakley. The iron-working furnace located in the valley just to the south of areas 1 and 2 comprised an oval bowl-shaped depression 80 by 55 centimetres in diameter and 10 centimetres deep, surrounded by a patch of heat-reddened clay, and belongs to the class of non-slag tapping furnace; 6 metres to the west ran a former watercourse. Both the furnace and the watercourse contained slag, some of which was adhering to fired clay; the latter need not necessarily imply that the furnace was surmounted by a clay shaft or dome but may simply reflect the material used to construct the surrounds of the bowl-shaped hollow. No direct dating evidence was recovered from either the furnace or the watercourse, but contemporaneity with the settlement described in the catalogue is suggested by three pieces of evidence: the occurrence of a fragment of slag (identical to that in the watercourse) and a piece of cinder in feature 22 and structure 1 on sites 2 and 1; the location of the source of the ore used (the Ironstone Junction Band at the base of the Upper Estuarine Series) a kilometre from the site makes "the coincidental siting of a furnace of different date near to the Early Iron Age settlement ..

unlikely" (Jackson *et al.*, 1982, 10); it is possible that several of the irregularly shaped and sized pits in area 2, which also contained plain ware sherds, were quarry scoops used in the location of ironstone erratics. However, even if contemporaneity with the settlement is claimed - and such an argument completely ignores the existence of Roman (quarry?) features containing charcoal and displaying burning 250 metres away - caution must be exercised before applying the radiocarbon dates from the latter to the furnace site, for ambiguities exist in the report, such as its failure to clarify the relationship between structures 1 and 2, or to explore the stratigraphic relationship between feature 9 and the gully in which it was located. Nevertheless, taking into account the similarity in the ceramic assemblages from areas 1 and 2, the excavator's conclusion that the eighth century B.C. date suggested by the radiocarbon dates may be applied to the entire, and seemingly single period, settlement, including the furnace, is accepted here. As for the sites of Weldon and Corby, evidence of actual furnaces was lacking in both cases, but slag found in association with pottery identical to that at Oakley suggests ironworking at an equally early date.

No other sites have been included in the primary catalogue, either because their evidence is too insecure or else their date too late. In the case of Park Lodge Quarry both reasons are relevant, for not only is it impossible to work out the relationship between the features which contain evidence of ironworking (F43, F44, Ditch C and D) and the pits containing decorative tradition pottery from the evidence contained in the report (Jackson, 1974b, fig. 16) - indeed, the pottery may even be residual - but the parallels cited by the excavator for one of the vessels (Jackson, 1974b, fig. 17.1) derive from levels at the site of

Rainsborough which are to be dated later than the 6th and 5th century b.c. radiocarbon dates quoted above¹. While it seems unlikely that the ironworking dates to the Roman period in the absence of relevant occupation traces in the vicinity of the site (other than six sherds) it may possibly date to the period of deposition of the currency-bar hoard; further investigation alone will answer this question. As for the ironwork from the primary occupation of the Rainsborough hillfort itself, little can be deduced about form or associations; the artefact, a small and very corroded rectangular strip of iron (1.5 x 3.0 cm; Avery *et al.*, 1965, fig. 31.173), deriving from occupation debris in the northern guard-room (R21) beneath the remake of the floor, is too formless to allow typological comparisons to be drawn, while its associations, seven sherds and a few fragments of antler and horn, are equally undiagnostic. In short, all that can be said with certainty is that iron occurs on the site during the primary occupation of the hillfort dated by the above-mentioned dates, a possible span on calibration of four calendar centuries. The ironworking evidence from both Wakerley and Harringworth has already been shown to be too late for inclusion in the catalogue, but reports of these sites, and those of Weekley Hall Wood (Jackson, 1976), Bulwick (Jackson, 1979a), Hunsbury (Fell, 1936, 96), and Draughton (Grimes, 1978) are of great interest, shedding light on the factors governing the siting of ironworking sites; the desire to locate smelting sites close to outcrops of ore and ready supplies of clay,

¹The relevant pottery shown in Avery *et al.*, figs 29, 132-140; 31, 154-5, 161, 164-6, 170, associated with an iron ring-headed pin and bronze ring with S-terminals, derives from layers subsequent to the first occupation of the guard-rooms and the use of the first cobbled road (layers R12, R14, R17, R19 and R22; Pl. XXIA), i.e. on the guard-room floors sealed by roof collapse and on the upper road, and are thus later than the date of the construction of the guard-rooms.

charcoal and water (Jackson, 1976, 72; 1979a, 36) must have pertained equally in the period under investigation - a point which will be returned to in discussing the overall distribution of the earliest iron-working in Great Britain.

SUSSEX AND THE SOUTH COAST

The next region to be studied comprises an area of clay vales and sandstone ridges which is defined on the north by the chalk ridge of the North Downs which extend from Farnham to Folkestone, encompasses the complementary chalk ridge of the South Downs running from Petersfield to Beachy Head and is bounded on the south by the coast between Portsmouth and Dover, a somewhat wider area than the Weald as strictly defined. It might be expected that since the latter region contained an abundance of all the requisites for ironworking - clay, charcoal, water and iron ore (the best occurring at the base of the Wadhurst Clay above the Ashdown Sand) - and was for centuries the centre of the English iron industry with furnaces continuing in existence until the 19th century A.D., the catalogue for this wider area would accordingly contain abundant evidence of such an industry dating to the period under discussion. This, however, is not the case; indeed, quite to the contrary, no sites of this date are known from the Wealden area, but occur in those areas devoid of iron resources, the South Downs and the Coastal Plain, sites which, moreover, yield little evidence of the early use of iron. Such a pattern may not reflect the true picture, however, but rather be the result of biased fieldwork which since the 1930's has concentrated on the easily recognisable hillforts of the South Downs - Highdown, Cissbury, Caburn, Trundle, Castle Hill, Torberry, Harting Beacon and Slonk Hill - overlooking putative early ironworking sites on the Weald evidenced only by sherd scatters, slag and shallow scoops, owing to the comparative difficulty of discerning them. Nor is it simply a question of discovery but also of survival, slag from the earliest ironworking sites, as from those dating to late in the Iron Age, probably having been removed in Roman, Medieval and modern times

for road-making, or traces of the process having been obliterated by subsequent activity in the area¹.

As Barrett has recently observed (1980a, 311), a sequence of Late Bronze Age - Early Iron Age pottery for the area has been recognised since the 1930's, details of which are contained in the following articles (Hawkes, 1935; 1939a; 1939b; Curwen, 1937; Wilson and Burstow, 1948; Cunliffe, 1966); such schemes are intrinsically similar, differing little from the original thesis proposed by Hawkes in his report on the pottery from Plumpton Plain (1935) and setting the sequence within a highly contracted timespan. Recently, the Hawkesian scheme has been drastically revised by Barrett and Champion in their articles of 1980, proposals which differ in chronological detail - which is scarcely surprising in view of the lack of radiocarbon determinations and properly associated metalwork in the area² - but agree on the essential sequence. Both envisage a tradition of plain ware pottery both overlapping with, and succeeding, Deverel Rimbury forms from the end of the second millennium B.C., and both chart a progression within this tradition from exceedingly plain bag-shaped jars similar to Middle Bronze Age types (indeed, thought by Ellison to be merely a Deverel-Rimbury variant) but distinguished from the latter by traits such as surface smearing,

¹Even when discovered their true significance may have been overlooked, for as Tebbutt has recently observed, there is no satisfactory way of distinguishing prehistoric bloomery slag from Medieval (Tebbutt, 1981, 59).

²The following sites contain both pottery and Later Bronze Age metalwork but the evidence contained in their reports is insufficient to prove that they occurred in association, and indeed in some cases suggests the opposite (e.g. Norris and Burstow, 1950, 1). At Highdown Hill, Sussex (Wilson, 1940; 1950) the potentially valuable stratified sequence with its attendant metalwork is impossible to reconstruct owing to inadequacies in the report. Little can be deduced about the location of the tweezers in relation to sherds of both plain and decorated ware at Kingston Buci, nor that of the hoards and pottery at either Belle Tout or West Blatchington.

slab-building and inturned rims - types found at Plumpton Plain Site B, Kingston Buci (Barrett, 1979a, figs. 1, 3 and 5) and Bishopstone (Bell, 1977, figs. 40 and 46) - to more elaborate forms such as round-bodied jars with constricted necks and short, out-turned rims decorated with finger-tip impressions either on an applied band on the neck or shoulder, shouldered jars and bipartite or hemispherical bowls, examples of which are found at Plumpton Plain B, New Barn Down, West Blatchington, Worthing, Bishopstone (Bell, 1977, figs. 47, 44 and 48; figs. 48, 53), Selsey and Highdown Hill. Dating these variants is difficult for the reasons stated above, and is made more so by stratigraphic difficulties at Bishopstone as will be discussed below. The assemblage of plain jars from Plumpton Plain Site B may date as early as the eleventh century B.C. on the basis of the occurrence there of a median-winged axe, a type which belongs to the Penard industrial tradition (Hawkes, 1935, fig. 16), while sherds of shell-tempered ware from layer 1 of the enclosure ditch at Bishopstone provided thermoluminescence dates of 1030 B.C. and 850 B.C. (probable limits of error: mid 13th - mid 7th centuries B.C.; Bell, 1977, 290). The occurrence of a Carp's Tongue hoard in a shouldered jar from Worthing suggests that the currency of this tradition should be extended into the eighth century B.C., this being in line with Barrett's suggestions but later than Champion's chronology.

Vessels dating to the later end of the plain ware tradition, that is to the 9th - 8th centuries B.C. on analogy with material from neighbouring areas, evince the use of finger impressions and cordons, but the decorative tradition proper, comprising such techniques as the application of haematite coating and incised geometric designs, the use of denser fabrics and the occurrence of such forms as bipartite carinated bowls

with sharp shoulders or furrowed necks, tripartite jars with sharp shoulders and flared rims, and straight-sided vessels with finger-impressed cordons - these occur at Harting Beacon, Castle Hill, Newhaven, Caburn, Trundle, Littlehampton, Lancing, Thundersbarrow, Hollingbury, Belle Tout and Stoke Clump - should be dated to the 8th-6th centuries B.C., again by comparison with extrinsic material, prior to a tradition of "developed decorated" wares from the 6th to the 4th century made up of small bowls with S-shaped profiles, bowls and jars with pedestal bases and large jars with tall flaring rims. Owing to the lack of clear evidence, however, and the misgivings which even Champion and Barrett have about their sequences, further definition of the typology and chronology of the ceramic sequence for this area will be avoided, though the dates and cultural comparanda of specific sites listed in the catalogues will be examined in greater detail below.

PRIMARY CATALOGUE

HARTING BEACON, Sussex

SU 808 183

3-sided univallate earthwork enclosing 10 hectares on north edge of the South Downs. No ditch or bank detectable on north side of site and interior virtually featureless both from the ground and the air, due to annual heavy ploughing. The site has a long history of examination from the 1940's onwards, 2 penannular gold rings having been found during the investigation of the western entrance in 1947. A rescue excavation was carried out in 1976 in advance of further deleterious ploughing, stripping an area of 1300 square metres in the South East corner (revealing pits, 4 and 6-posthole structures) and cutting a section through the southern defences, while a further 4-week campaign

occurred in this same area in the following year, during which time the western entrance was re-examined. Finds from the two most recent campaigns comprised an assemblage of decorative tradition pottery to be discussed in the text, bloomery slag, a spindle whorl, chalk loomweight and bronze harness ornament.

Bibl.: Keef, 1950; 1953.

Bedwin, 1978a; 1979a.

Mus.: Chichester Museum

DISCUSSION

Only one site merits inclusion in the primary catalogue, and even this has not produced abundant or helpful evidence of early ironworking. Two seasons of excavation at the univallate hillfort of Harting Beacon revealed a settlement defended by a timber-revetted turf rampart, comprising four and six-poster structures, pits and postholes which yielded an assemblage of decorative tradition pottery - open shouldered and tripartite jars, bipartite and furrowed bowls, and displaying fingertip and nail-impressed decoration, stabbed lines, dots, cordons and horizontal grooves; securely associated with such pottery was a piece of iron slag (Pit 3). One problem, however, confuses this seemingly clear-cut piece of evidence for the occurrence of iron in an eighth-sixth century context, namely the radiocarbon date of 270 ± 80 b.c. (Har 2411) derived from human skeletal material from the recut of the southern ditch terminal (layers 8 and 8a), for these layers also contained pottery of early decorative tradition type. On the one hand it may be argued that the tradition had a longer currency than hitherto imagined, and by extension that the iron may date equally as late; on the other hand it may be that the radiocarbon date and the pottery have no bearing

upon each other, residual pottery having been scraped up and deposited with the skull in later (ritual?) activity¹ on the site. In support of this hypothesis the following observation is of interest:

"The recutting of the ditch terminals has no defensive significance; it is more likely that the recuts are simply rubbish pits cut into a partially silted up ditch. It should be remembered that no such recut was seen in a section through the southern defences".

(Bedwin, 1979a, 25)

The second explanation is here preferred, hence the site's occurrence in the primary catalogue.

It will be observed that two sites from this area usually listed in any consideration of our earliest ironwork, those of Plumpton Plain and Sompting, Sussex, have been omitted from the primary catalogue; clearly some explanation of their absence must be proffered. In the case of the former (Holleyman and Curwen, 1935; Burstow and Holleyman, 1959), a settlement complex situated on top of the South Downs six miles north-east of Brighton and comprising two subsites - Site A being made up of four banked enclosures, trackways and lynched fields and associated with Middle Bronze Age pottery, Site B consisting of occupation features possibly on a defended spur and associated with plain ware vessels - the doubtfulness of the reported evidence militates against its inclusion. An iron spearhead is reputed to have come from a trackway associated with enclosure IV Site A, but neither its form nor its context is illustrated or described in any greater detail save

¹Note that not only was a human skull placed in the ditch terminal, but human teeth were simultaneously placed in the dismantled gate-posts (Bedwin, 1979a, 25). If a "ritual" explanation is allowed this would explain the absence of later domestic pottery, the only artefact which can be associated with such activity being the Middle Iron Age gilded horse-harness ornament (fig. 7.15) found in the topsoil in area IV.

that it was of "La Tène II type" and "doubtless a stray" (Holleyman and Curwen, 1935, 32); under these circumstances it would be foolish to apply the date of the pottery to the iron. As for the whetstones found on both subsites (*ibid.*, 36) and thus associated with both Middle Bronze Age and plain ware sherds, it is now thought (O'Connor, 1973-5, 240) that the iron traces thereon are the result of natural iron in the subsoil; the loss of these artefacts, however, means that certainty is now impossible, hence the relegation of this evidence to the secondary catalogue.

Excavation by mechanical digger at the second site yielded yet another supposedly "bi-metallic" hoard, but this one too is spurious. The find, situated at the bottom of a downland valley in the Parish of Sompting, near Worthing, contained the greater part of a bronze cauldron of Leeds' B₂ type, sheets of bronze apparently derived from one or more larger cauldrons, a Hallstatt C phalera and seventeen socketed axes of rectangular or subrectangular section, one of which, according to Curwen

"has an extensive encrustation of iron rust on the face as if it had lain in contact with an iron object which has been corroded away".

(Curwen, 1948, 162)

And he continued:

"There is, I think, no likely source of iron in the soil sufficient to cause such encrustation, and the question arises as to whether it indicates the former presence of an iron implement contemporary with the hoard".

(*ibid.*, 162)

Over the years, Curwen's tentative suggestion - and it was no more than that - has petrified into unquestioned fact, as the statements quoted

on page 67 and that which follows demonstrate:

"The extensive encrustation of iron on one face of a socketed axe from the hoard at Sompting indicates the association of an iron article".

(Challis and Harding, 1975,
40)

First-hand examination of the hoard (Worthing Museum) together with consideration of the circumstances of its discovery and context suggest otherwise, for rather than one axe displaying signs of contact with an iron object, several are coated with a rust-coloured solution, indicative of the presence of iron salts in the soil, traces of which could quite easily have been overlooked by Curwen as the finds were not *in situ* on recovery but "clawed from the ground by the mechanical grab" from a context which had been disturbed by subsequent ploughing. In my opinion such grounds are not sufficiently secure to suggest the presence of an iron object nor merit the site's inclusion in the category of primary evidence.

In striving to establish a ceramic sequence for the area, Champion observed that

"Much of the material from older excavations is indeed of limited value; publications are frequently only partial and couched in an out-dated terminology ... and even the value of the original collections is restricted by the reliance that can be placed on the quality of the excavations, the observation of stratigraphy and the care taken with recovery and preservation. In some cases at least it is impossible to be greatly confident in the use of older material".

(Champion, 1980b, 43)

Such shortcomings likewise hamper the evaluation of the date of some iron artefacts which may have been associated with decorative tradition

pottery, such as that from the Caburn and the Trundle. In the first instance it is impossible to isolate contexts containing Caburn 1 (our early decorative tradition) pottery exclusively (though a pre-rampart phase of occupation can be distinguished stratigraphically), and hence an equally early date cannot be applied to the iron artefacts, nodules and slag, while in the second, a shortage of information contained in the report prevents the reconstruction of the site's history and the ascription of secure dates to the ironwork, despite lengthy attempts to achieve the same. It is not simply old excavations, however, that pose problems of interpretation but also those of more modern date, as the following instance shows. Excavation between 1969 and 1974 on the small enclosed settlement at Slonk Hill, Shoreham, Sussex (Hartridge, 1977-8) revealed a three-phase sequence, the first consisting of pits and posthole groupings associated with decorative horizon pottery (*ibid.*, fig. 12, 1-17; fig. 14, 74, 81-7, 137), the second comprising pits and posthole groupings associated with S-shaped profile bowls and jars, pedestal-based vessels, iron slag and iron artefacts including a La Tène I brooch with disc foot and an involuted brooch. While all the iron artefacts are demonstrably of Phases 2 or 3, one piece of iron slag, together with shells and sherds, was contained in an area of small burnt flints and rubble sealing Pit 43 of phase 1. These sherds are not illustrated, neither is there any stratigraphic means of deciding to which phase the slag belongs, and thus the more prudent explanation would be to associate it with material from the adjacent pit, Pit 42, which is of Phase 2 (*viz.* fig. 14, 71-3) - especially in view of the disturbance that a modern trench caused in this area (square XXIVE). Thus this example too must be relegated to the secondary list.

The evidence from the settlement complex at Bishopstone, Rookery Hill, Sussex, is equally enigmatic owing to difficulty in unravelling the site's history due to "a paucity of stratigraphic relationships" (Bell, 1977, 49). The first phase of occupation consists of pits and posthole structures belonging to an unenclosed settlement which contained such plain ware pottery as the undecorated high-shouldered jar and angular-shouldered bowl from Pit 699 (*ibid.*, fig. 45.37 and 38). This was succeeded by an enclosed settlement of pits, postholes and posthole structures bounded by a two-entranced V-shaped ditch and associated with a varied assemblage of pottery from plain ware vessels to pedestal-based pottery, and with a range of artefact types which included a La Tène I fibula. Two instances of the occurrence of iron associated with this second phase bear investigation, the first being that of iron-staining on a pebble from Pit 228, a circular feature rich in occupation débris including a group of hemispherical bowls and straight-sided jars which Champion attributed to the post-Deverel Rimbury tradition. This need not, however, imply the use of iron artefacts at such an early stage but may rather refer to the burnishing of vessels of iron-oxide rich fabrics, such as occur within that very pit (note the constituents of vessel 45, for example). The second instance is that of a piece of iron slag from layer 2a of the enclosure ditch, apparently stratified beneath a group of plain ware vessels (their average date lying in the 10th century B.C.), yet deriving from a layer which yielded pedestal-based and bead-rimmed barrel-shaped vessels and a La Tène I fibula. However, scrutiny of the report reveals that the ditch had been recut several times "after it had entirely filled with sediment", hence the mixing of material within it and the consequent dismissal of this piece of evidence from the primary catalogue.

THE LOWER THAMES AND ITS ESTUARY

The next area to be examined comprises the Thames Estuary and the lower reaches of the river, that synclinal region of gravel terraces, sands, alluvium and clay now termed the London Basin, delimited by the North Downs to the south, the Cookham plateau and the Chilterns to the west, the East Anglian Heights to the north-west and the River Stour to the north, thus encompassing the modern counties of Middlesex and Essex, as well as parts of Buckinghamshire, Berkshire, Surrey and Kent. In view of the density of population in this area and the intensity of industrial development, motorway construction and river clearance, as well as the existence of numerous long-established and highly active local societies, the presence of several Museums both National and local, and the involvement of those employed by or studying in the various archaeological and academic bodies based in London, it is to be expected that evidence of the later prehistoric period, as of all periods, be prolific - and indeed reviews such as those of Lawrence (1929), Barrett and Canham (L.A.M.A.S., 1976) and Celoria and MacDonald (1969) bear this out. In recent years, understanding of the Late Bronze Age - Early Iron Age transition has altered radically owing to a spate of excavations on sites of this period (such as Mucking, Essex; Runnymede Bridge, Petters Sports Field and Brooklands, Weybridge, Surrey; Highstead, Kent) which in turn has occasioned the reappraisal of earlier excavations and the re-examination of collections in museum storerooms (e.g. Mill Hill, Minnis Bay and Sturry, Kent; Green Lane, Farnham and Queen Mary's Hospital, Carshalton, Surrey; Plegdon, Essex; Yiewsley, Middlesex), such a proliferation in information being reflected in the mass of papers presented to conferences in Clacton, Leeds and

Broadstairs in 1978 and 1979 (later published as Drury, 1980; Barrett and Bradley, 1980a and Leach, 1982) and by the following site reports: Longley (1976); O'Connell and Needham (1977); Hanworth and Tomalin (1977); Longley and Needham (1979); Jones and Bond (1980)).

Such is the wealth of material pertaining to this period that the following examination does not, indeed cannot, encompass all the evidence and seeks rather to outline the ceramic sequence drawing on such material as will be particularly helpful in the dating of those assemblages listed as containing iron; accordingly, only those sites mentioned here and in the discussion are shown on Map 11.

While the demise of the Deverel Rimbury tradition appears not to have occurred synchronously throughout the area - Barrett proposes a date at the end of the first millennium B.C. for material from the lower reaches of the Thames Valley and Essex (1980a, 307, 312) while Elsdon, following Lowther (1939, 188; 1982, 137-8) argues for a later termination (and hence an overlap with the currency of the plain ware tradition) in Surrey - the advent of a series of thin-walled plain jars and bowls distinctly different from bucket-shaped vessels occurs uniformly from the eleventh century B.C. Sites which yield such material include Queen Mary's Hospital, Carshalton, Surrey (layer 5 of the enclosure ditch yielded a wide-mouthed bowl), Beddington, Surrey, Heathrow, Middlesex (the material from Grimes' excavations includes sherds of slab-built jars with external finger-striations), Shoebury, Essex (associated with six lumps of bronze: B.M. 1892.6-13.1-27; W.G. 2184-8), Green Lane, Farnham, Surrey and Site 507, Farnham, Surrey; the latter two assemblages are the most varied, comprising carinated bowls, biconical jars, wide-mouthed

jars with rounded shoulders, short upright or slightly everted necks and rounded, tapered or flattened rims, and barrel-shaped jars with hooked or flattened rims; decoration is scarce, merely involving finger-smoothing, shallow scoring or burnishing on external surfaces, while bases are flat or slightly protruding, some being covered in crushed flint. Radiocarbon determinations are rare, the sole one available, that of 510 ± 110 b.c. (Q 760) from grain associated with wide-mouthed bowls and jars with concave necks from Weston Wood, Albury, Surrey being disturbingly "late"¹; dating consequently relies rather on comparison with similar assemblages from other regions.

From the 9th century B.C. assemblages occur which contain not only plain jars and bowls, (still the predominant form), but also vessels evincing such decorative techniques as finger-tipping, nail-impressions and the incision of hatched triangles or wavy lines. The currency of these can be established with far greater accuracy than was the case with the previous tradition, three means of dating being available. First, two sites yielding such assemblages have produced groups of tightly clustered and well-associated radiocarbon dates, these being Mucking, Essex and Runnymede Bridge, Egham, Surrey. Dates from the larger bivallate ditched enclosure at the first site, the South Rings², associated with flint-gritted shouldered jars and carinated bowls

¹Calibration according to the 5730 half-life at 2 standard deviations produces a range of 900-430 B.C., arguably within Barrett's 11th-9th century B.C. range for the Post-Deverel Rimbury tradition - but a manipulated single radiocarbon date is insufficient evidence.

²Those from the slightly smaller enclosure 1 km away, the North Rings, fall somewhat later (Har 2911: 750 ± 80 b.c. and Har 2893: 680 ± 110 b.c.) but it must be noted that these occur in the secondary silts of the phase 2 ditch and may not be directly associated with such pottery. Clarification of this point must await the final publication.

which show finger-impressions or slashing on top, inside and outside the rims, on necks, shoulders, at the base angle and on applied neck cardons, lie in the 9th - 8th centuries B.C. when calibrated; they are as follows:

Har 1634	820 ± 110 b.c.
Har 1630	840 ± 90 b.c.
Har 1708	860 ± 70 b.c.

Similar dates have been derived from two sites within the Runnymede Bridge, Egham, settlement which has yielded a vast assemblage of vessels of this tradition - high shouldered bucket jars with upright or slightly everted rims, biconical jars, slack shouldered jars, biconical bowls, open bowls with outward curving rims, fine ware bipartite bowls with tall concave necks, displaying such decorative techniques as finger-tipping on rims and shoulders of jar forms (and in one case on an applied cordon), hatching and combing - and these are listed below.

Occupation layer Site 1

Har 1833	670 ± 70 b.c.
Har 1834	800 ± 70 b.c.

Site 2

<i>From a pit</i>	Har 3113	720 ± 80 b.c.
	Har 3112	750 ± 70 b.c.
	Har 3119	760 ± 130 b.c.
	Har 3118	770 ± 90 b.c.

Pile rows

<i>Advance</i>	Har 4267	690 ± 70 b.c.
<i>row 1</i>	Har 4272	740 ± 80 b.c.
<i>Advance</i>	Har 4265	680 ± 60 b.c.
<i>row 2</i>	Har 4664	690 ± 70 b.c.
	Har 4270	630 ± 80 b.c.
<i>Main pile</i>	Har 4275	870 ± 70 b.c.
<i>row</i>	Har 4257	700 ± 70 b.c.
	Har 4341	830 ± 80 b.c.
	Har 4274	820 ± 90 b.c.
	Har 4269	740 ± 70 b.c.
	Har 4277	780 ± 70 b.c.

Other sites containing such vessel types include Twitty Fee, Danbury, Essex, Park Farm, Great Bromley, Essex, Langdon Hills, Essex (surface finds), Old England, Brentford, Middlesex, Linford, Essex, Carshalton, Surrey and Coombe Warren, Surrey.

The second means of dating these assemblages so accurately is by way of artefactual associations, and here the evidence is prolific. In summary, sites yielding such pottery also contain metalwork dating to the Ewart Park industrial tradition - in particular, nail-headed pins, small rings, tanged bifid razors, tweezers and casting débris - and a narrow range of bone, antler and fired clay artefacts such as perforated clay plaques, cylindrical and pyramidal loomweights and shale bracelets; such evidence is tabulated overleaf for brevity, adequate discussion of the dates of such artefacts being contained in the following articles (Needham, in Longley, 1980; Needham and Longley, 1980; Needham and Burgess, 1980).

The third means concerns the pottery itself, namely comparison of vessel types and decorative techniques with material from Continental Urnfield assemblages, in particular those of Late HaA and HaB date from the Low Countries and Northern France. Techniques such as the incision of hatched triangles occur in the Rhineland from Hallstatt A₂, those of combing, furrowing, the use of finger-tip impressions along the top of, below and on the outer edge of rims and the application of swag designs from Hallstatt B (Desittere, 1968, figs. 22-3: Roitzheim, Kr. Euskirchen), while the use of finger-impressed neck cordons also occur in Hallstatt B contexts in the Netherlands (see Vlodrop, Nederlands Limburg; Desittere, 1968, fig. 68.4). As for forms, biconical jars with tall cylindrical necks occur frequently in Hallstatt B contexts in Desittere's Vlaamse group (Massemen, Oost

TABLE 6:

	Bifid razors (heel-shaped)	Shale bracelets	Biconical spindlewhorls	Clay plaques	Bronze rings	Cylindrical loomweights	Pyramidal loomweights	Nail-headed pins	Ingot fragments	Tweezers	Moulds
<i>Coombe Warren, Surrey</i>				✓		✓			✓		
<i>Highstead, Kent</i>				✓							✓
<i>Mill Hill, Kent</i>		✓			✓			✓			✓
<i>Mucking, Essex</i>							✓	✓		✓	
<i>Milner's Gravel Pit, Kent</i>							✓				✓
<i>Yiewsley, Middlesex</i>				✓							
<i>Old England, Middlesex</i>	✓				✓					✓	
<i>Heathrow, Middlesex</i>				✓		✓					
<i>Carshalton, Surrey</i>				✓		✓			✓		
<i>Runnymede Bridge, Surrey</i>	✓	✓	✓		✓		✓	✓	✓	✓	✓
<i>Caesar's Camp, Surrey</i>				✓		✓			✓		

Vlaanderen, Grave 19; Destelbergen, Oost Vlaanderen; figs. 87.4; 85, 1 and 4) and parallels for biconical jars with rilling at the base of the neck, such as occur amongst the unpublished material from Milner's Gravel Pit, Sturry, Kent (British Museum Reserve Collection; Pit 5¹) are to be found in Hallstatt B contexts in his Noordwestelijke group (which spans the Lower Rhine and Maas areas in South Holland and Belgium; e.g. Budberg, Kr. Moers, grave 3; Desittere, 1968, fig. 29.4).

A sequence within the decorative tradition inaugurated by these assemblages can be established on the basis of two traits, those of decoration and fabric; on the one hand a trend towards sandy fabrics, following the predominant use of flint gritted fabrics, is observable, and on the other an increase in the use and flamboyance of decorative motifs on a wider range of vessels. Such developments are thought to date from the eighth century B.C., but the evidence for this is rather shaky. One site used in support of such a chronology is that of Minnis Bay, Birchington, Kent, first discovered in 1938 through the finding of a bronze hoard on the foreshore, excavated by Worsfold between 1938 and 1940 and investigated subsequently by Powell-Cotton. In a major reappraisal of Worsfold's account of his excavations published in the *Proceedings of the Prehistoric Society* for 1943 and in his second draft (MSS, Maidstone Museum), Champion exposed inconsistencies in the interpretation of the site, in particular its situation and phasing, maintaining that it was a single-phase dry land site which suffered erosion subsequent to its abandonment, rather than a two-phase settle-

¹ I thank S. Needham for alerting me to the existence of this material, and for helpful discussion about it.

ment situated on the foreshore and destroyed by flooding (Champion, 1976, 33-42; 1980c, 231-3). The pits and large hollow (Worsfold, 1943, fig. 2), though not in stratigraphic relationship to one another, are now judged to be contemporary, while the pottery - jars with S-shaped profiles and high angular shoulders, bipartite angular bowls and wide-mouthed bowls of almost hemispherical shape evincing cabling, finger-printing, slashing and channelling - far from seeming to belong to discrete ceramic traditions (Ritchie, 1969, 54), can now be seen to be contemporary, vessels with both rounded and angular profiles having been found together in a recently excavated pit (Pit N, Champion, 1976, fig. 14). The crucial point for this study, however, is the relationship of the Carp's Tongue hoard¹, thought to come from Pit 15, and the pottery; while it is reasonable to assume that the features are contemporary and hence that the pottery may be dated by the hoard, it is important to notice that there is no means of relating features to one another stratigraphically and that such a correlation is mere conjecture.

In view of the importance that has been placed upon it in dating this tradition, the relationship of the Carp's Tongue hoard and a similar assemblage of pottery from the enclosure ditch at Petters Sports Field, Egham, Surrey, also requires close scrutiny. The hoard, seventy-eight items including copper ingots, moulds, casting jets and untrimmed casts, had been deposited in the upper silts (Layer II) of a V-shaped ditch, the construction of which (according to radiocarbon determinations

¹ One account of the hoard's discovery details its location as "in an irregular depression in the chalk", thought to be Pit 15 on account of further similar bronzes having since been found in that area by Powell-Cotton.

BM 1622 and BM 1625) may have been contemporary with the settlement at Runnymede, and was sealed by a thick black deposit which contained convex-sided vessels with round rims, high-shouldered jars, jars and bowls with distinct shoulders and concave necks and bipartite bowls with plain or developed rims, displaying an increased use of finger-tip decoration on rims and shoulders, especially of high-shouldered jars, and a more sparing use of flint grit. Radiocarbon dates extracted from the uppermost level of the ditch, and considered to date both hoard and pottery (Burleigh *et al.*, 1981, 19) fall in the 6th and 5th centuries b.c., "rather later than expected for these wares". Interpretation of the sequence of events varies, my own being to envisage the hoard and pottery as virtually contemporary - and note that O'Connell and Needham report that sherds found in the same level as the hoard are "of the same character and type as that found in the layer above" (O'Connell and Needham, 1977, 126) - the radiocarbon determinations dating silts which may have formed slowly (the ditch having by then achieved a stable profile) and not necessarily relating to the pottery¹. The point to stress however is that, as in the case of Minnis Bay, the relationship between hoard and pottery is unclear, and hence the claim that the tradition dates from the eighth century B.C. must be treated with due caution.

¹ This would seem to be the viewpoint held by Needham judging by the argument advanced in support of the date of the axe mould from elsewhere on the site at Egham (Needham, 1981, 32)

"The fill from which the mould came also yielded a group of pottery sherds which can be compared closely to a larger pottery assemblage recovered elsewhere on the site in 1976. Much of the latter pottery occurred in a ditch-fill deposit stratified immediately above a large hoard datable to the Ewart Park phase. On the ceramic evidence the contexts for mould and hoard respectively should be approximately contemporary".

The next change of tradition in the pottery sequence of this area is marked by the appearance of assemblages containing carinated bowl forms with pedestal bases, plain round-shouldered jars and round-bodied bowls, of which the material from Orsett, Essex (CF 110, 111 and 127: Barrett in Hedges and Buckley, 1978), thought to date no earlier than the 6th century, and probably rather to the 5th - 4th centuries, B.C. is a good example. Similar assemblages come from Heathrow, Middlesex¹ (Canham's excavations) from which independent dating evidence is derived in the form of a La Tène I fibula stratified in the base of a hollow which contained a pedestal-based sherd (and which was contemporary with features producing round-bodied bowls and jars with double rows of finger-tip impressions similar to that from Orsett: *ibid.*, fig. 41.67), Linford, Essex and Wisley, Surrey, but these lie outside the present remit, the concern here being rather with those assemblages which precede them. Ordering the material which lies between the Runnymede-Mucking and Orsett-Heathrow horizons is currently an impossible task, few assemblages being associated with helpful artefacts, many occurring on sites of lengthy occupation² and only one assemblage, that from the upper silts of the causewayed ditch

¹ Occupation of this site was clearly of long duration and conflation of the phases must be avoided. The vessel (fig. 15, 37) from Pit J for instance, similar to material from Minnis Bay, cannot be related to the rest of the features; indeed, it may even "indicate the presence of another settlement" (Canham *et al.*, 1978, 19).

² Re-appraisal of the material from and stratigraphy of several sites indicates that occupation was of lengthy duration and that evidence derives from several phases, the classic example being that of Linford, Essex; Hawkes commented that "it seems easiest to take the pottery as a single group, and to assign it all to an occupation in the 4th century B.C." (Hawkes in Barton, 1962, 87), but current thinking would rather ascribe it to several phases.

at Orsett, being related to material which produced a radiocarbon date (564 ± 81 b.c. BM 1379). Sites which yield such material, dating roughly between the 8th and 6th centuries, include the following - Sandown Park, Esher, Hawk's Hill and Brooklands (Early Land Surface), Surrey, Langdon Hills, Downham Grange, Thorney Bay, Loughton Camp, Amresbury Banks, Asheldam Camp, Mucking and Rawreth, Essex - adequate discussions of the range of vessels being found in the following articles (Rodwell, 1976; Drury, 1978; Drury, 1980).

PRIMARY CATALOGUE

BROOKLANDS, Weybridge, Surrey

TQ 068.632

An apparently open Iron Age settlement situated on a promontory of Bagshot Beds sand sloping into the flood plain of the River Wey. The site first gained archaeological recognition in 1907 when workmen constructing the Brooklands motortrack found a cordoned bronze bucket, and for the next 30 years close watch was kept on the site by a local antiquarian who reported the finding of pottery and connected the site with a nearby hillfort (Gardner, 1911, 1912, 1915). More recently, trial excavations (Tomalin, 1964 and 1965), a geophysical survey (1969) and extensive excavations (Hanworth, 1970-71) have been carried out on the site. Settlement traces include the ring-gully of a house, hearths, gullies and pits, some of the latter belonging to two discrete ironworking areas for smelting and forging. Finds include spindle-whorls, a loomweight, a fragmentary shale armlet, metallurgical débris, a large ceramic assemblage and iron objects (blade tip, latch lifter, buckle, pointed ferrule and nails); the latter, however, with the exception of the material from Pit 177 (and possibly also from Feature 247) were associated with a pottery assemblage which included burnished

jars and saucepan pots, rather than the forms which belong to the 8th - 6th centuries B.C. and thus will not be examined here.

Bibl.: Gardner, 1911; 1912; 1915
Hanworth and Tomalin, 1977

MILL HILL, Deal, Kent

TR 365 513

The site comprises a large ring ditch enclosure, 50 metres in diameter, with a single entrance to the south-east, situated on a chalk ridge above Deal overlooking the southern end of the Wantsum and Lydden Valley marshes. Scanty excavations by Stebbing in 1934 in advance of housing development tackled only the ditch and largely ignored the interior - though soundings in the latter area revealed the presence of a pit, a hearth and a hollow (interpreted as a hut circle) and these were excavated. The site yielded a fascinating artefactual assemblage, which sadly has not yet been fully published (British Museum Reserve Collection, 1939, 10-3); this includes a bronze nail-headed pin (1939, 10-3.2), shale bracelets, a fragmentary bronze blade and a piece from a clay mould for casting rings (1939, 10-3.61) from the bottom of the enclosure ditch in the north-west sector, a bronze ring of diamond section from the bottom of the pit (1939, 10-3.1) and, from various contexts, flint, bone, antler, quernstones and perforated clay plaques. Iron in the form of slag occurred in the enclosure ditch east of the entrance and "a mass of iron resembling a ploughshare" was found to the south-east of the entrance. Furthermore, a large and most useful pottery assemblage was recovered, comprising jars with finger-tipped impressed or slashed cordons (1939, 10-3.143; 306, 312) around the neck, angular and hemispherical bowls and large jars with S-shaped profiles or angular necks, occasionally with handles (Brailsford, 1953, fig. 16).

Bibl.: Stebbing, 1934
 Champion, 1976; 1980c

Mus.: British Museum

DISCUSSION

It was noted above that in the period 1000-800 B.C. East Kent was in direct and close contact with the Urnfield cultures of North-Western France and the Low Countries (Cunliffe, 1982, 41) and thus it is not surprising that perhaps as early as the 9th century, and certainly by the 8th century B.C., iron should be in use in the latter area. It is in the earlier century that Champion would place the ceramic assemblage from Mill Hill, Deal (1982a, 38) - jars with finger-tipped or slashed impressed cordons around the neck (1939, 10.3-143, 306, 312), angular and plain hemispherical bowls, shouldered bowls with everted rims and impressed triangles on the shoulders filled with white inlay, and large jars with S-shaped profiles or angular necks, occasionally with handles - and while little is known about the context of the "mass of iron" save that it was found to the south-east of the entrance¹ precluding assertion of its contemporaneity with such pottery, the stretch of enclosure ditch east of the entrance yielded both pottery and iron slag (1939, 10-3.5; 195-206), finds which may be regarded as contemporary. Nor is this the sole instance in Kent, for the British Museum reserve collection houses a fascinating, but as yet unpublished, collection of pottery, metallurgical débris, flint, daub, pyramidal loom-

¹ Examination of all the excavation records for this site in the British Museum sheds no further light on its provenance.

weights and a perforated clay plaque fragment from pits discovered over several years (1939-47) at Milner's Gravel Pit, Sturry. The pottery, comprising large jars with S-shaped profiles, concave necks and with rims decorated along the outer edge with pie-crusting, finger-tipping or slashing, plain open bowls with simple or flat rims, and globular handled jars and shouldered bowls with everted rims, is similar to the assemblage from Mill Hill, and was associated with material rather doubtfully labelled "furnace lining" (see Bayley's comments with regard to the Winklebury, Hants. *débris* above) and more convincingly with iron slag (e.g. Box 2). It is to be hoped that the publication of this material be shortly expedited in view of its significance and usefulness.

Considering its location close to a suitable ore source, the iron carbonates of the Bracklesham Beds, it is not surprising that traces of ironworking are to be found on the open settlement at Brooklands, Weybridge, Surrey, a site which might date as early as the eighth century B.C., this on the basis of the pottery recovered from the early land surface. The assemblage, comprising angular shouldered coarse ware jars with upright necks, thickened or flattened rims and nail impressions on shoulder and rim, bipartite bowls, some with panels of stabbed decoration on the shoulder, and barrel-shaped jars (Hanworth and Tomalin, 1977, figs. 16 and 17, 54-102) compares closely in form, decoration and fabric to that from Petters Sports Field and thus could be earlier than Close-Brooks suggested (1977, 40), dating between the eighth and sixth centuries B.C. Further early material comes from Pit 177 - the relationship of which to the surrounding occupation *débris* is not made clear by the section (fig. 9, section 177) consisting of round-shouldered coarse ware jars with finger-tipping around the necks and

rims, deep bipartite bowls and jars with sharply carinated necks, and obtusely angled shoulders, vessels which again need not be dated as late as Close-Brooks proposed, fitting rather into the 8th - 6th century bracket of the preceding group. Further refining of the chronology is however difficult; first, it is impossible to demonstrate that the assemblage from Pit 177 is stratigraphically later than that from the Early Land Surface as the latter occurs only in the south-western corner of the site, and second, it is hard to assess whether there is also a stylistic development, a mere 7% of the pit's contents having been illustrated in the report (fig. 21); indeed, Close-Brooks admits that the scarcity of reconstructable vessels precludes the drawing of such conclusions (while nevertheless assigning a 5th century date to the latter material).

While most of the iron-working débris, furnace remains and iron artefacts are associated exclusively or predominantly (e.g. Furnaces 240 and 247, which include early, residual?, sherds) with Middle Iron Age pottery, one pit provides evidence of early ironworking; Pit 177, the pottery from which was argued to date to the 8th - 6th centuries, and which was uncontaminated by later material, also contained smithing slag and burnt daub¹.

The evidence from the following sites does not merit inclusion in the primary catalogue as brief examination of their respective reports demonstrates. The most readily dismissed of them all - indeed, in the

¹Reinforcement of the argument that Pit 177 is earlier than the evidence of ironworking which surrounds it in the Eastern Iron Working area is provided by its shape, which is markedly circular in contrast to the oval and oblong forms of the later phase.

entire catalogue - is that of an iron spearhead with lozenge-shaped blade contained in an urn of "common Bronze Age type" found at Abbeyfield, Colchester, Essex in 1810 (Smith, 1925, 87, 121, no. 7; Abercromby, 1912, vol. II, Pl. XCV, 51); Cunnington (1934, 24) disputes the association but modern observers also dispute the identification of the iron fragment, considering it rather to be part of a Victorian railing (pers. comm. J.C. Barrett). Secondly, Gingell has suggested in print that the Minnis Bay Carp's Tongue hoard contained iron (Gingell, 1979, 248) - but examination of the collection in the British Museum leads me to dispute this (though only scientific analysis of the fragments in question, 1961.10-6.87, will settle this conclusively¹). Thirdly, the iron ring from Vincles Farm, Ardleigh, Essex (Erith and Holbert, 1970, fig. 15, no. 42), a three-phase settlement (*contra* the excavators, *ibid.*, 14) which, in its earliest phase, yields pottery considered by Drury to be equivalent to finger-printed and cordoned wares from Mucking and Linford, must be discounted as its context is unclear; moreover, the single section cut in the ditch revealed that the primary silt contained not only a bipartite jar with incisions around the shoulder (*ibid.*, fig. 15, no. 35) but also a bowl decorated with scoring (fig. 13, no. 15) and hence the iron, whatever its location, is likely to date later than the period under review.

The evidence from a further two sites must be omitted on account of its late date, though such material is worth mentioning here if only to indicate the point at which the production of iron increased. Two phases of "Early Pre-Roman Iron Age" (*sic*) occupation within the

¹ The fragments in question are described as "pieces of bronze" in the British Museum's register of accessions. Incidentally, the staining on the bone strips (1940.7-3, 75) from the same hoard need not indicate the presence of iron rivets.

causewayed enclosure at Orsett, Essex (area C; south central area) were noticed during excavations in 1975 (Hedges and Buckley, 1978), the first, from the upper level of the inner causewayed enclosure ditch (F4 layer 3) yielding plain or decorated jars and bipartite bowls, associated material producing a radiocarbon date of 564 ± 81 b.c. (BM 1379), the second, four pits (F 101, 107, 111 and 127) and Feature 110 yielding round shouldered jars and carinated bowls with pedestal bases, an assemblage which Barrett (in Hedges and Buckley, 1978, 287) would place in at least the 6th century B.C., and preferably in the 5th-4th centuries B.C. Iron, in the form of artefacts (CF 101.4 ring-headed pin; CF 107.5 oval ring; CF 101.4 six iron rings), as fragments (CF 265.3) and as slag occurs in abundance, but scrutiny of the report reveals that this is associated with the later of the two ceramic assemblages and thus does not merit consideration here. Similarly, while there is undoubtedly early pottery at the open settlement of Hawk's Hill, Leatherhead, Surrey (Hastings, 1966), this is unfortunately inextricably mixed up in the pits with later wares. Thus while slag and a nail come from Pits 9, 10 and 11, which include such forms as large incised haematite coated jars and fragments of small, sharply carinated bowls, it must be noted that these pits also yield globular jars with thickened out-turned rims, one in Pit 10 being decorated with shallow tooled designs, hence preventing the prosecution of an assured early date.

One startling omission from the primary catalogue is that of the iron nail found in association with an A1 type bronze cauldron during excavations in 1932 at Sheepen Hill, close to the southern edge of Region 3 at Camolodunum (Hawkes and Hull, 1933; 1947; Hawkes and Smith, 1957, 160-5, 171), which might be thought, from the argument

outlined in the footnote below¹, to be one of the earliest instances of iron in the entire catalogue. Hawkes, however, has recently declared (*in litt* to Roger Thomas) that the "peg" was no more than a shattered fragment of iron pan, a likely occurrence in the sand and gravel soil of the area; having failed to locate the artefact I bow to Professor Hawkes' opinion based as it is on first-hand knowledge - hence the omission of the association from the catalogue.

Further potentially informative artefacts which would appear on typological grounds to be early cannot be dated precisely on account of their contexts. Several iron spearheads have been found in stretches of the Thames which yield prolific finds of this period - the London Museum register, for instance, lists six iron spearheads and several fragments of further examples reputed to come from "off Old England, Brentford, Thames" (0.1781; 0.1784-6; 0.1788-9 and 0.2063 a-c)², but while it is tempting to suggest that they are of Hallstatt date (as do

¹ In their classic article of 1957 Hawkes and Smith argued that the cauldron series originated in Britain at the transition from the 8th to the 7th centuries B.C., deriving ultimately from Oriental examples in Urartu and transmitted westwards by Greek traders, a view largely accepted ever since, modifications being made merely to the thinking regarding the means of diffusion. O'Connor, however, has recently challenged both date and derivation, basing his argument on the occurrence of fragments of Class A₁ cauldrons in the Isleham hoard, Cambs. (O'Connor, 1980, 147-8); adherence to the accepted chronology would result in the hoard having to be placed late in the Ewart Park industrial tradition, an unacceptable suggestion for an assemblage made up purely of Wilburton types. While admitting that there are difficulties in the hypothesis, O'Connor, following Herity and Eogan (1977, 204) proposes a North European origin for Atlantic cauldrons in Montelian Period III tallying with his proposed derivation and date for another class of beaten sheet artefacts, Yetholm type shields. Thus the possibility has been opened up that type A cauldrons date not simply from the Late 8th century B.C. as before, but from the 10th century, their currency being roughly three centuries long.

² Indeed, an iron knife, 0.1793 and an iron ring, A.01546, were also reported as having come from this (vague) location.

Kendrick and Hawkes, 1932, 205-6; Jope, 1961, 321), proof of this is lacking. Likewise the nine looped and unlooped iron socketed axes from the Thames Valley, Walthamstow, Grays Thurrock and Colchester, Essex. As Manning and Saunders wrote,

"The generally accepted view of the date of these axes is that they belong to the very beginning of the Iron Age and represent a transitional phase between the use of iron and bronze...this view undoubtedly [originating] from their similarity to cast bronze axes".

(Manning and Saunders,
1972, 280)

Argument rages as to whether the technology is not of a more advanced standard than that encountered in an emergent industry, but the controversy will not be resolved through untutored speculation, but rather by the type of detailed metallurgical analysis undertaken by B.G. Scott (Scott, 1971; 1974b; 1976b; 1977b). Certainly the contexts of the axes listed here are of little help, all but one occurring as stray finds and the exception, that from Colchester, coming from a 1st century A.D. level. If then we set the spearheads and axes on one side, as prudence demands, and also disregard the late 7th century London antennae sword on the grounds that it is clearly an import, it is clear that the early iron industry in the Lower Thames Valley and Estuary remained at a negligible level until the start of the Thames dagger sequence in the later 6th century, a qualitative and quantitative jump which will require investigation in a later section.

THE FENLAND AREA

The next region to be examined, the lowland area roughly delimited by the natural boundaries of the East Midland plateau to the west, the East Anglian Heights to the south and east and the River Welland to the north, a flat expanse of marsh, peat, clay and estuarine silt drained by the Rivers Nene, Ouse and Cam, will be treated in atypical fashion for two reasons, the first being the lack of sites producing clear evidence of the use of iron in the period under review; as in the case of the other region which lacked such evidence, the Upper Thames Basin, iron ore deposits are absent. To create a primary catalogue out of the little available evidence would be to confer spurious authenticity on highly doubtful material, hence its omission and the rather more discursive nature of this section. Secondly, the establishment of a local sequence for the decorated tradition pottery from the area is currently impossible owing to a dearth of stratified sequences, useful associations and radiocarbon dates (Hartley, 1957, 18; Simco, 1973, 5; Spratling, 1974, 269; Pryor and Cranstone, 1978, 11-13); to attempt such a task here would be presumptuous and the result meaningless. A more flexible format than that hitherto adopted is therefore needed, one which will permit discussion of particular ceramic contexts, parallels and associations, while avoiding the necessity of marshalling them into a rigid sequence.

Study of the styles and currency of earlier first millennium pottery, however, is not impeded by such difficulties but is rather aided by the existence of numerous secure associations with metalwork, a diagnostic loomweight form and material suitable for radiocarbon dating. Plain ware vessels appear to follow on those of the Deverel-Rimbury complex by the opening of the first millennium B.C. (Barrett, 1980a,

313), demonstrably early examples being the thin-walled vessel with plain flattened rim and strap handle in which the Isleham hoard of the Wilburton industrial phase was contained, and those from Sandy Lodge Lane, Colne Valley, Watford, Herts. (Cottrill, 1939) associated with two cylindrical baked clay loomweights (*ibid.*, fig. 1, nos. 5 and 6), a type which was superseded by pyramidal forms in the ninth century B.C. (Needham and Burgess, 1980, 465). Further plain ware vessels are to be found amongst the following assemblages: Foulke's Pit, Kempston, Beds. (Simco, 1973, fig. 3), Fordham, Cambs. (Barrett, 1975, 105), Turnford Green, Herts. (Barrett, 1979, fig. 1, no. 2) and Green End Road, Cambs. (Barrett, 1980a, fig. 5, 13-16), while those from the Newark Road (Pryor, 1980, 103, fig. 61; Pryor, 1976, fig. 3.5, no. 12) and Cat's Road subsites (Pryor, 1980, 151, fig. 89, 4-6) at Fengate clearly belong to a developed stage of this tradition, both on stylistic grounds and by virtue of the determination of 790 ± 80 b.c. (Har 773) recovered from charcoal associated with such sherds from the backfill of Pit F17 on the former site¹.

¹Several sherds have been found in association with metalwork of the Ewart Park industrial phase, but the published descriptions are largely unhelpful. That found with the Carp's Tongue hoard at Cumberlow Green, Rushden, Herts. of which only one sherd is now extant was simply described as "hard, black ware" (Coombs, 1979, 193) and that from a workman's trench at Lordship Lane, Letchworth, Herts. associated with a tanged and triangular bladed chisel as "Iron Age A" (Needham and Burgess, 1980, 464); the later Bronze Age metalwork from Thorley, Herts. (Needham and Burgess, 1980, 465) cannot reasonably be associated with the coarse finger-printed sherds and fine black sherds from the kiln-shaped pit on Thorley Hill (Ellcock, 1968) and little is known about that associated with "fine bronze pins of Heathery Burn type" (i.e. nail-headed pins) and a bronze wire bracelet with reverted ends from a gravel pit at Lambourne Pit, Chippenham, Cambs. (P.C.A.S. XXXIX, 1938-9, 60). Forthcoming publication of the pottery from Great Humphreys, Aston, Herts., found during field-walking near to a tanged and collared triangular bladed chisel and a nail-headed pin, promises to be more helpful (pers. comm. S. Needham).

While such evidence, and Champion's recent reassessment of the date of the decorated bowl forms from Wyman Abbott's excavations at Fengate (designated as belonging to the Middle Phase by Hawkes and Fell but now shown to have Late Urnfield parallels on the Continent: Champion, 1975, 136), points to the existence of decorated bowl and jar forms by the ninth century B.C., the chronological disentanglement of this tradition is as difficult now as it was in the mid 70's (*pace* Spratling, 1974). Secure associations are few, one such being that of thirty sherds of black-brown finger-tip decorated ware with flattened rims and rounded shoulders with a trapezoidal double-looped bronze razor with slightly convex cutting edge found while digging an anti-tank trench in Hills Road, Cambridge (Fell, Lethbridge and Bushnell, 1949, Pl.XIV, H; Collins, 1948, 76-7); the latter belongs to Jockenhovel's "Endigen" class (Jockenhövel, 1971, 238-9) current during Hallstatt C in Britain, Belgium, West Germany and Southern France. Others include that between a bronze penannular brooch of Fowler's Aa type (thought to have a long currency throughout the Iron Age [Fowler, 1960, 171] and thus of little use as a chronological indicator) and an assemblage which includes sherds with scored decoration and footring bases at the Vicarage Farm subsite, Fengate (Pryor, 1974, F22, fig. 15, 1-10), a bronze swan's neck sunflower pin with iron shank from Wyman Abbott's Fengate excavation (Hawkes and Fell, 1943, fig. 1, A₁; thought by Spratling to date between the 6th and 3rd centuries B.C. though Hawkes [1976c] is more specific) with a vessel with an applied neck cordon (Hawkes and Fell, 1945, fig. 1, A₂), that between a bronze swan's neck pin and a sherd decorated with chevrons incised prior to firing from Pit 2 at Wilbury, Cambs. (Applebaum, 1949, fig. 15, no. 8; 44), and that between a type A penannular brooch with pottery which

included a pedestal-based bowl and a jar decorated with a double row of finger-tip impressions at Wandlebury, Cambs. (see below). Radiocarbon dates are equally scarce and advance our understanding but little; that from the bottom of Pit F6 on the Vicarage Farm subsite (Pryor, 1974, fig. 14, 1-21; Radiocarbon, vol. 17, 1975, 229) - UB 822: 340 ± 125 b.c. - has been used to date an entire pit group (the formation of which, as of any, is ill-understood) which comprises a wide variety of vessel types, fabrics and decorative techniques - sherds filled with white inlay, a carinated bowl with slashed shoulder decoration and a footring base - a date, moreover, which is scarcely distinguishable from that from the base of a wattle-lined pit on the Padholme Road subsite (GaK 4198: 350 ± 46 b.c.; layer 5, feature 3b; Pryor, 1974, 38; fig. 22, 4-10) associated with a largely homogeneous assemblage of scored bulbous jars.

Clearly, such internal evidence is insufficient for the construction of a detailed sequence and thus any attempt to date the earliest iron in this area must rely upon external comparisons, chiefly with material from the Chilterns and the Thames Valley. While no iron occurs in association with sherds of the plain ware tradition, a few instances have been recorded from contexts which yield decorated tradition sherds, and these demand consideration. First, Wilbury Hill, Herts., an oval univallate hillfort one mile west of Letchworth, frequently described and examined from the eighteenth century onwards and excavated by Applebaum in 1933 and by Moss Eccardt in 1959; study of these reports (Applebaum, 1934a, 352-61; 1949, 12-45; Eccardt, 1964, 34-46) suggests that the rampart was preceded by a timber palisade set in a slot, possibly associated with early decorative tradition pottery (though sadly this is neither illustrated nor described; Ritchie, 1969, 88)¹.

The iron artefacts from both campaigns - a fragmentary knife-blade, two nail fragments and a hook from the 1959 excavations (Eccardt, *ibid.*, fig. 6, 1-4), a ring-headed pin, bracelet fragment, fibula and amorphous scrap from the earlier excavations (Applebaum, 1949, fig. 15, 7-9) - cannot be attributed to such an early phase, coming rather from contexts which pertain to the occupation associated with the later rampart containing globular and barrel-shaped jars and bowls with short everted or beaded rims, some with simple footring bases, minimal finger-tipped decoration but plentiful use of designs after firing; in short, an assemblage similar to that from Pitstone, Bucks. (Waugh in Cotton and Frere, 1968, 219-49) placed late in Saunders' Phase 2 of the Chilterns sequence (mid 5th - late 4th B.C.) and allied to further material from Chinnor, Oxon. (that stratified beneath the rosette stamped wares), Holwell, Herts., Jack's Hill, Wymondley, Cambs., Cherry Hinton, Cambs. and Barley, Cambs. The iron from Wandlebury hillfort (Hartley, 1957, fig. 9) is of a similarly late date, for even if the ring-headed pin, ferrule and penannular brooch can all be shown to derive conclusively from the earliest contexts on the site (i.e. sealed beneath the inner rampart and below the gravel layer), such contexts also contain a vessel with a pedestal base, barrel or globular-shaped vessels decorated with scored vertical lines, a jar with a double row of finger-tipped decoration, sherds decorated with geometric decoration incised after firing (*ibid.*, fig. 7, 1-19; fig. 8, 36-52) and a bronze penannular brooch, material which O'Connor would date to the 5th century B.C. (O'Connor, 1973-5, 235-240).

←¹It would be fascinating to know more about the location of the Later Bronze Age metalwork from the site (Needham and Burgess, 1980, 464) in view of the presence of this putative pre-rampart phase of occupation.

The associations of the iron-working débris from two other sites likewise cannot be related to the period under discussion, that from Aldwick, Herts. (Cra'ster, 1961, 22-46), comprising lumps of bloom and a possible tuyère associated with a pottery assemblage similar to those from Wilbury and Wandlebury, and that from Fengate, a fragment of iron smelting furnace with accreted slag and a piece of fayalite slag from Storey's Bar Road and Padholme Road subsites respectively, apparently associated with Middle and Late Iron Age pottery. Furthermore, the provenance of the four circular lumps of ironstone from the multi-period site at Abington Pigotts, Cambs. (Fox, 1922-3, 214), which yielded bowls decorated with incised and punched decoration and a bronze ring-headed pin, is simply described as being "on the site", and their date shakily ascribed to the Early Iron Age on the basis of "their primitive character", pitifully inconclusive evidence from such a potentially informative site. In short, none of the iron artefacts or evidence of ironworking from this area can conclusively be dated prior to the 6th - 5th centuries B.C., an interesting conclusion in view of the absence of iron ore thereabouts, and one which will be taken up later in the discussion section.

NORFOLK AND SUFFOLK

The next area to be considered comprises the lowlands to the east of the Fenland region discussed above, a low plateau, much of it barely above sea-level, bounded on the west by the Great Ouse and the East Anglian Heights, to the north and east by the North Sea and to the south by the River Stour, roughly coterminous with the modern counties of Norfolk and Suffolk. The history of Iron Age research in this area in the early years of this century - the researches of the Prehistoric Society of East Anglia and the Norfolk Research Committee founded in 1908 and 1934 respectively, and such notable excavations as those of Armstrong at Grimes Graves between 1924 and 1925, Apling at West Harling in 1932 and Clarke and Apling at Warborough Hill in 1936 - has been adequately summarised by Clarke (1939, 4-6) and needs no repetition here; subsequent developments include further work at the former two sites (Clark and Fell, 1953; Mercer, 1981), and the work of the Norfolk Archaeological Unit, but in general the pattern of research is little different from that described by Clarke in 1939, being still a case of "accidental and unexpected recovery" rather than one of planned strategies. The rigours of the progressive agricultural system pioneered in East Anglia in the eighteenth century, and those of the Forestry Commission, have taken their toll of extant field monuments in this area, an area, moreover, which has lacked a tradition of local antiquarians and more recently has been largely overlooked by aerial surveyors. The paucity of later prehistoric evidence is highlighted by Lawson's observation that the total ceramic collection for the Bronze Age in Norfolk could be placed on a single table (Lawson, 1980a, 271).

Discussion of the evidence from this region, as with that from the previous, will be brief, eschewing the pattern adopted in the majority

of sections, for here, too, the ceramic sequence is ill-understood and the contexts and associations of the supposedly earliest ironwork extremely dubious. The means of ordering the pottery into a chronological sequence are slender - few radiocarbon dates are currently available, stratified sequences or relationships between different styles of pottery are rare (though scrutiny of the West Harling report suggests the existence of one such sequence) and most of the supposed associations of bronzes and pottery prove on examination to be rather insecure or, if secure, unhelpful¹ - and hence comparison with material from neighbouring regions, in particular the Thames Estuary and Lower Thames Valley, is the most helpful approach. Since it would thus be unwise to attempt to manipulate the material into a detailed sequence at this stage, the following discussion will simply outline the current state of understanding and examine the typological and cultural connections of selected assemblages.

As Barrett has recently observed (1980a, 312), the date of the end of the use of Deverel Rimbury vessels in East Anglia is currently in dispute, with Lawson arguing for the tradition's continuation into the first millennium B.C. (Lawson, 1980a, 279; 800 b.c.), Barrett himself preferring an earlier termination (tenth century B.C.) synchronous with that in other regions of southern England, this disagreement depending on differing interpretations of a series of radiocarbon dates from the upper fill of a Late Neolithic flint mine shaft, shaft X, at Grimes Graves,

¹The sherds found with the hoard from South Creake, Waterden, Norfolk (N.C.M. 87, 964 (1-9); N.C.M. cat. 31-2) disintegrated on excavation while those from Red Barn, Snettisham and Hackford Hill, Reepham, Norfolk (N.A. XXI, 1947, 32; N.A. XXX, 1952, 156-9) were not directly associated with the hoards. The description of those found with the Carp's Tongue hoard from North Elmham (McClough and Wade-Martins, 1970, 6-18) is not helpful - "very small body sherds of a dark and slightly gritty ware, lacking diagnostic features".

Weeting, Norfolk, which also contained sherds of bucket urns with raised cordons with finger-tip impressions. From the same context, however, came a series of sherds with thinned rims and constricted necks, seemingly attributable in form, fabric and style to the plain ware tradition and perhaps arguing for an overlapping of the two traditions; further such sherds come from Runcton Holme, Norfolk (Lawson, 1980a, 5H and I), from near the Late Bronze Age hoard at Aylsham, Norfolk (Lawson, 1980a, fig. 5G; N.C.M. cat., 30) with a type II barbed spearhead allying it to the Broadward tradition, from Kettleburgh, Suffolk¹ (O'Connor, 1973-5, fig. 64, 1-8) and from Beeston Regis, Norfolk. The latter find alone provides conclusive dating evidence for this tradition, containing as it did a hoard of the Ewart Park industrial tradition (including faceted socketed axes, a socketed gouge, chisel, peghole socketed spearhead and a chape; Lawson, 1980b); the bowl itself was of deeply carinated form, the neck slightly concave and inverted, the rim simple, set on a low foot and with a scored surface. Its fabric, hard with a fine flint filler, invites reconsideration of the date of other bowls from this area, hitherto deemed Early Iron Age types.

It is in determining, ordering and dating the types of pottery that follow such plain ware vessels, seemingly current in the ninth-eighth centuries B.C., and precede scored and pedestal-based vessels which occur from the fourth century onwards, that the chief difficulties lie,

¹O'Connor allied the material from a pit on a sand extraction site south of Kettleburgh village - everted sherds in thin fabrics with rims tapering outwards, and sherds with inturned profiles having either slightly expanded or out-turned rims - to material from pre-rampart contexts at Rams Hill, Berks. (Barrett, 1975, fig. 3.5, no. 27) and to Continental Urnfield assemblages, thus confirming the 9th-8th century date suggested by Beeston Regis.

for use of the terms "West Harling - Staple Howe", "Darmsden - Linton" and "Fengate - Cromer" is no longer acceptable. With regard to the former, two points should be noted, the first being the multiplicity of contexts from which such pottery derives. In the case of Micklemoor Hill, West Harling, the pottery occurs throughout the four subsites, probably resulting from protracted occupation¹, thus rendering the settlement as unsuitable a choice of type-site as Dowris is for Irish Late Bronze Age studies. Nor is it only on stratigraphic grounds that a longer timespan than that envisaged by Cunliffe for the currency of such pottery be suggested, but also stylistically; the use of neck cordons on coarse jars occurs, as will be seen below, at Mucking, Essex, in contexts yielding radiocarbon dates as early as the 9th century b.c., while biconical bowls with short necks and beaded or short everted rims (Clark and Fell, 1953, fig. 16.97) occur in 9th-8th century B.C. contexts at Runnymede, Egham, Surrey (Longley's Type 4; Longley, 1980) and at the slightly later site of Petter's Sports Field, Surrey, as do burnished carinated bowls. The time-scale over which the pottery may range can best be illustrated by the currency of the slack shouldered jars (Clark and Fell, *ibid.*, 11; 9, 11-17; fig. 12, 18-19); these likewise occur at Runnymede (Langley, Type 15) but are also to be found amongst the Group 2 material from Kettleburgh, Suffolk in a context which, on analogy with material from Wandlebury, Cambs., may date to the 5th century B.C., while the use of double rows of finger-tipping (fig. 12, 20 and 21) and applied neck cordons (fig. 10, no. 4) occur in similarly late contexts (Wandlebury, Hartley, 1957, fig. 8, no. 37; Fengate, Hawkes and

¹Site II, for example, need not be interpreted as a single period unit, (*pace* Clark and Fell, 1953, 14), though it is hard to argue otherwise given the information contained in the report.

Fell, 1943, fig. 1, A1). None of the pottery from Micklemoor Hill, moreover, is associated with precisely datable artefacts, so the assemblage is little more than an unhelpful collection of pottery styles and forms. Nor is that from Home Farm, Kettleburgh, Suffolk more enlightening, for nothing is known about the circumstances of its discovery or of the context in which it lay - and indeed Balkwill has even suggested that two sites may be involved. Comparison with material from neighbouring regions suggests that the following ceramic assemblages should be dated early in the decorative pottery tradition - Badwell Ash, Norfolk (*Ant. J.* vol. XV, 1935, 474-5), Barrow Hill, Thetford, Norfolk, Lakenheath, Suffolk (Briscoe, 1948-9, 92-111) and Warborough Hill, Stiffkey, Norfolk - but the proposal is highly tentative and should be treated accordingly.

Inability to define an early decorated tradition in this region does not, however, hamper discussion of the earliest ironwork for all but one of the cases which are reputed to date to the Late Bronze Age - Early Iron Age are spurious and require little discussion. The attribution of two iron spearheads from Barrow Bottom, Norfolk to the transition from Bronze Age to Iron Age on account of their resemblance to bronze spearheads is doubtful (Fox, 1923, 76-7), it being more likely that they are medieval in date. Two further finds have to be discounted owing to a paucity of information in their respective reports. Iron slag was apparently found in the primary silting of a rectangular ditched area at Brampton Piece, Aylsham, Norfolk (Clarke, 1960, 399) together with pottery of "Iron Age A" type, but the report, five lines in length, lacks descriptions or illustrations of the pottery or the context from which it was derived. Equally enigmatic are the reports of a find made in 1933 on the north bank of the River Stour at Stutton, Suffolk;

according to Clarke (1939, 20-22), excavation of a collapsed cairn revealed a large bucket urn type vessel of hard baked clay inverted over a bowl of dark brown ware and associated with a fragment of a triangular clay loomweight, bricks of burnt clay and charcoal. Iron fragments were supposedly distributed around the base of the cairn, but The Catalogue of an Exhibition of Recent Archaeological Discoveries (University of London, 1938, 39) makes no mention of these, which may possibly have been little more than natural nodules¹. Lack of detailed observation also necessitates the exclusion of Warborough Hill, Stiffkey from the catalogue, for it is likely that the level beneath the mound in which "Iron Age A" potsherds and the fragment of an iron blade occur has been disturbed; it is therefore reasonable to suggest that the iron belongs with the Roman material from the site (Clarke and Apling, 1935, 408-28). Finally, three recent finds of iron supposedly in association with Late Bronze Age hoards may also be discounted. The corroded iron object found among a recently discovered hoard in Thorndon, Suffolk (Ipswich City Museum, 1981, 54), which contained a Carp's Tongue sword fragment, is of modern manufacture, as is that found during prospection with a metal-detector at Bunwell, Norfolk in the vicinity of a fascinating hoard which contained, amongst other artefacts, a barbed spearhead, socketed hammer and plain socketed gouge. It is more difficult to deny the antiquity of the nail-like iron fragments found in the vicinity of a hoard of bronzes at Great Melton, Norfolk on typological grounds alone but any assessment of their date should bear in mind the occurrence of metal finds of all periods - lumps and sheets of lead, fragments, lumps and artefacts of modern copper alloy, and unidentified

¹Clarke does in fact mention the existence of "septaria nodules" in his report.

slags - within the same restricted area (8 x 4 metres) as that in which the hoard (which included notched tanged razors, faceted, ribbed and Sompting type socketed axes and a pegged spearhead) was found; further discussion of this find, however, must await its full publication¹.

The only secure early instance of iron from this region is thus that from a deposit in the top of a flint-mine shaft from the 9-hectare complex at Grimes Graves, Weeting, Norfolk (Mercer, 1976, 105; 1981, 16-18); the later of two inhumations, an adult male lying in a pit cut into and disturbing the primary, female, inhumation, was furnished with two heavily corroded iron ring beads, 8 millimetres in diameter. A radiocarbon date, recovered from charcoal associated with the earlier inhumation, may reasonably be applied to the later, the interval separating the two internments being thought to be negligible; this lay in the mid-sixth century b.c. (B.M. 780: 515 ± 230 b.c.), conceivably belonging as early as the tenth century B.C. upon calibration (McKerrell).

¹I am exceedingly grateful to Dr. A.J. Lawson for arranging for me to see the Great Melton and Bunwell hoards in 1982 and for passing on information about the Thorndon hoard; the opinions expressed about these finds, however, are mine and may differ from his own.

THE WITHAM - TYNE AREA

The area considered in the following section, though large, geographically diverse and unevenly studied, can be considered to be an entity on ceramic grounds, and is so treated here. While its northern boundary is quite distinct, being formed by the Tyne-Solway valley, its southern limit is harder to define as Harding has observed (Challis and Harding, 1975, preface), and is here drawn between the Witham and Mersey estuaries, thus excluding the Cheshire Plain but encompassing the southern Pennines. A number of topographical areas are contained within these boundaries, such as the West Midland Plateau, the Pennines, the Vales of York and Trent, the North York Moors and the East Yorkshire and Lincolnshire scarps and vales, and the area moreover encompasses several productive sources of iron ore, in particular in North East Yorkshire and North Lincolnshire. The history of research into the later prehistory of the region prior to 1972 has been adequately summarised in Challis and Harding's synthesis of 1975 (1975, 2-5) and needs no further consideration here, though their comments regarding the unsatisfactory nature of much of the evidence in this region due to "the remarkable paucity of material remains coupled with the very shallow soil profile" and commercial exploitation certainly bear repetition. Work since then has been both prolific and valuable, and the following study will draw heavily upon recent fieldwork and excavation by the Car Dyke Research Group, the Trent Valley Archaeological Rescue Committee and the South Lincolnshire Archaeological Unit, the recent excavations of Chowne, Coombs and Manby at Billingborough, Mam Tor and Thwing (Chowne, 1978, 1980; Coombs, 1976; Coombs and Thompson, 1979; Manby, 1979, 1980 respectively), the pottery reports of Elsdon (1979) and Barrett (1979b; 1980a) and May's recent synthesis of work in Lincolnshire (May, 1976).

Several attempts have been made in the past to establish a pottery sequence for the region, the most detailed being that of Challis and Harding in their consideration of the Trent-Tyne region, but the scheme outlined below, the only one which encompasses the new material from the recent excavations cited above, is that of Barrett, set forth in his report on the Mam Tor assemblage (1979b) and in his seminal article of the following year (1980a, 313). Only the briefest summary of the ceramic sequence will be given, however, as the amount of early iron from the region and, unusually, of the dating evidence associated with it, militates against the need for a detailed discussion.

Whilst its relationship with Deverel Rimbury material is not made clear, the existence of a plain ware tradition from at least the tenth century B.C. is posited, this on the evidence of material from Mam Tor, Derbyshire, Thwing and Grimthorpe, Yorkshire, and Billingborough, Lincolnshire. Though the first site, a six hectare hillfort at the southern end of the Pennines in the Derbyshire Peak District containing huts of double circle post-construction, stake holes and storage pits, produced a large and varied assemblage of pottery belonging to the plain ware tradition¹, this unfortunately is of little assistance in constructing a ceramic sequence for the area, for the pottery was merely associated with a very fragmentary ribbed socketed axe (so corroded as to preclude precise identification), whetstones and fragmentary shale armlets. As for the two radiocarbon dates (Birm. 202, 1180 ± 132 b.c.

¹The assemblage comprised biconical tubs, high-shouldered bucket jars with smeared surfaces, some with internally bevelled rims, jars with globular bodies and out-turned rims and concave-sided jars with hooked rims; rims are thickened, internally bevelled or slightly flattened, fabrics are coarse with a slip or slurried coating, while decoration is rare, being confined to finger-tipping on shoulders or beneath the rims.

and Birm. 192, 1130 ± 115 b.c.), it is difficult to determine from the available details whether these should be associated directly with the pottery (*pace* Coombs and Thompson, 1979, 44) or viewed as relating to an occupation prior to that represented by the gullies, pits, post-holes and ceramic assemblage (*pace* Elsdon, 1979, 168).

The evidence from Thwing, Yorkshire (Manby, 1979, 1980) is, however, more helpful, for here barrel and bucket forms with simple rims in coarse calcite-gritted fabrics and displaying finger-grooved surfaces, as well as predominantly undecorated carinated and shouldered jars and bowls and a series of fine bowls and cups, were associated with occupation débris which included not only cylindrical and pyramidal loomweights, shale and jet bracelets and implements of flint and stone, but also a peg from a barbed spearhead of the Broadward industrial tradition and pins with decorated heads "of Urnfield type" (this on the evidence of Manby, 1979, 241). Some of the pottery, moreover, was found in association with a hearth on the Old Land Surface beneath the outer rampart, a context which yielded a radiocarbon date of 950 ± 70 b.c. (Har 1398). A similar assemblage, made up predominantly of shouldered jars in coarse gritted fabrics with concave necks and everted rims, some, less than 2%, bearing cabling along the rim, others with finger-tipping on rim or shoulder, was contained in Layers 4 and 5 of the small circular hillfort at Grimthorpe (Stead, 1968; and see catalogue below); both layers seemingly derive from the same phase of occupation (Challis and Harding, 1975, 33) and thus the radiocarbon date of 690 ± 130 b.c. (NPL 136) may be considered to refer to the entire assemblage. Finally, the second phase of occupation at Billingborough Lincs. (Chowne, 1978; 1979; 1980), which succeeded an occupation containing pottery of the Deverel Rimbury tradition,

yielded jars with internally hooked rims, small bowls and vessels with vertical smearing and surface rippling (Chowne, 1978, fig. 6, 8-17; fig. 7, 18-21), an assemblage which can be linked with a radiocarbon date of 1198 ± 57 b.c. (BM 1410). Challis and Harding have discussed further material which may be assigned to this tradition such as concave-sided jars with hooked rims from Ball Cross Farm, Derbyshire (Challis and Harding, 1975, fig. 3; 5, 7; compare Coombs and Thompson, 1979, fig. 17, 11 and fig. 22, 2; Chowne, 1978, fig. 7; 19, 20) and vessels with bevelled rims from Harborough Cave, Derbyshire and Roomer Common, Yorkshire, but the foregoing will be sufficient to demonstrate the existence of a tradition of plain, thin-walled jars, both coarse and fine, with hooked, plain or bevelled rims and plain bowls, both forms bearing such distinctive techniques of manufacture as finger-moulding, rough tooling and surface smearing (Barrett, 1979b, 46-7) which occurred from at least the tenth century B.C., perhaps even from two centuries earlier, and continued into the seventh century¹. If the tradition does not appear convincing from the foregoing résumé, the ceramic forms too generalised, the surface techniques too widespread, the reader is referred to the more detailed discussions of the evidence contained in the following references (Barrett, 1979b; Challis and Harding, 1975, 30-39), the purpose here being merely to block in the outlines of the ceramic sequence.

¹Sherds of jars with curving or slightly shouldered profiles with upright or slightly out-turned necks occur on the old land surfaces of Barrows 2 and 7 at Ampleforth Moor, Yorkshire (Challis and Harding, 1975, fig. 45.12; compare Coombs and Thompson, 1979, figs. 16, 5; 17, 6; 19, 1; 20, 1 and 27, 1); radiocarbon dates of 537 ± 90 b.c. (BM 368) and 582 ± 90 b.c. (BM369) have been derived from charcoal from similar contexts beneath Barrows 7 and 3.

The appearance of a wider variety of forms and decorative techniques may be dated to the ninth - eighth centuries B.C. on the evidence of associated metalwork and other settlement débris from the following sites. First, that of Castle Hill, Scarborough, a seemingly unenclosed settlement on an exposed headland comprising pits and posthole structures. As stated in the catalogue below, it is impossible to extrapolate a sequence of occupation for this site on stratigraphic grounds, owing to the patchy nature of the excavation records held in Scarborough Museum and differences in the accounts of the site's sequence offered by Smith, Simpson, Elgee and Wheeler; attempts to do so have concentrated on the ceramic evidence (Challis and Harding, 1975, 46-50). A sequence of occupation may indeed have occurred - certain pits, for instance, cut one another - but what is now clear is that none of the occupation débris need require a date later than the eighth century B.C. The closest parallels for the bronze metalwork - Yorkshire and plain socketed axes, nail-headed pins, rings, a plain penannular bracelet with slightly enlarged terminals and fragments of two others, a tanged chisel, an awl, a socketed gouge, scoriae and a jet - are to be found in assemblages of the Ewart Park - Heathery Burn traditions¹, while the pottery, which may likewise be viewed as belonging to a single tradition, finds its closest analogies among Late Urnfield material from the Low Countries (Desittere, 1968, figs. 29.4; 57, 1;

¹Good parallels for the bracelet, ring, pins and gouge for instance are to be found in the Heathery Burn Cave deposit, Co. Durham (Inv. Arch., G.B. 55, 10) while an exceptionally close parallel for one of the pins which bears decoration on its upper shaft is contained among the material from Runnymede Bridge, Surrey (Longley, 1980, fig. 12, 11) dated to the ninth-eighth centuries B.C. as argued above (see page 211-5). It is important to note that the well-known "Scarborough" Hallstatt knobbed bracelet was found a quarter of a mile to the west of the occupation site and is thus irrelevant to the discussion; its date should not be allowed to depress that of the other metalwork.

68, 4; 78, 4, and 102), and assemblages of the ninth-eighth centuries B.C. from the Lower Thames Valley and Estuary. The assemblage is made up of bucket and barrel-shaped vessels with internally thickened rims and raised neckbands, biconical or round-bodied jars with outward flaring rims, slack-shouldered jars with upright or slightly everted rims and short necks, tall jars with relatively sharp shoulders and everted rims, and decorated bipartite bowls with simple rims; decoration comprises finger-tipping and nail-incisions, either on applied cordons or directly onto rims and shoulders, and geometric incisions on the finer bowls, while one jar bears horizontal grooving at the base of the neck, a trait already noted as occurring in Hallstatt B assemblages in the Low Countries (see above, page 215). Even the necked "situla" (Challis and Harding, 1975, fig. 42, 11), the presence of which is thought to indicate a later date for the material from the occupation "floor" (*ibid.*, 50) may be dated to the ninth-eighth centuries; its form occurs among the material from Grimthorpe (Stead, 1968, fig. 7, 10), but even if one wishes to derive that rather from metal prototypes, surely the date of the closest local template, the bucket from the Heathery Burn deposit, Co. Durham, is of most relevance?

Applied cordons are also to be found on bucket-like vessels from Heathery Burn alongside a group of bronzes dating exclusively to the Ewart Park tradition - a ribbed button, roll-headed pin, cup-headed pin, circular strap crossing, socketed gouge, awl, Ewart Park sword, phalerae of Continental Late Urnfield type and nail-headed pins, to mention just some of the assemblage (Inv. Arch. G.B. 55) - while a further group of Ewart Park settlement debris, comprising tweezers, a plain bronze bracelet and a jet⁴ bracelet of sub-rectangular section was found during quarrying at Grafton, Yorks. (Waterman *et al.*, 1952-55)

in association with coarse bowls and jars with everted rims bearing finger-tip or nail decoration along the top of, or on the outer edge of, the rims and around the shoulders. Further south at Washingborough, Lincs. (May, 1976, 109-112; Chowne, 1980, 300; Needham and Longley, 1980, 427-8), a similar assemblage of round-bodied jars with upright rims in calcite, shell or flint-gritted wares, large coarse jars with rounded profiles and finer wares, which include an open carinated bowl with tapering out-turned rim and a smaller bowl with internally-bevelled rim, were derived from excavations by Coles and Orme in 1973 along the bank of the River Witham east of Lincoln. These, sadly, were not associated with the antler cheekpiece of Late Urnfield type (which was merely found during drainage work in the area in the previous year), but came from five layers of silty material in a pool probably close to an occupation site, the majority occurring in the lowest two levels; charcoal from the lowest level yielded a date of 303 ± 70 b.c. (Q 1163), but this refers to the deposition of the silts and not directly to the finds which are in a derived position (Needham and Longley, 1980, 428). The material from Island Carr trackway, Brigg, Ancholme Valley (May, 1976, 112-4) is more helpful, a jar with rounded shoulders and everted rim bearing a decorated applied neck-cordon having been found in the vicinity of a wooden trackway on the surface of which lay a cup-headed pin (Davey, 1973, 226, fig. 24); charcoal from the surface of the peat layer surrounding the trackway yielded a radiocarbon date of 602 ± 120 b.c. (Q77). Lastly, the assemblage from Willington, Derbyshire (Elsdon, 1979) made up of straight-sided jars with thickened collars, large jars with slightly everted necks and jars with flaring rims and globular bodies, some vessels displaying finger-tipped rims and tooled chevron designs; while metalwork of the Ewart Park tradition

was lacking from this site, truncated pyramidal loomweights of the type found at such sites as Mucking, Runnymede, Thwing, Ivinghoe Beacon, Knight's Farm, Aldermaston Wharf and the Breiddin were found associated exclusively with such pottery, lending strength to the early first millennium date suggested by the ceramic forms¹.

The demise of the decorative tradition may be set in the fourth century B.C. with the advent of assemblages dominated by deeply scored barrel-shaped and bead-rimmed vessels, this on the evidence of pottery and associated finds from Willington, Derbyshire, Breedon-on-the-Hill and Burrough Hill, Leicestershire, Fisherwick, Staffordshire and Ancaster, Lincolnshire, but arranging the material which lies between this date and that of the developed plain ware/early decorated traditions discussed above is not such an easy task. The assemblage from Staple Howe, Yorkshire may be used to exemplify the pottery types characteristic of the seventh-sixth centuries B.C., thus completing this rapid survey of the ceramic sequence.

The outstanding features are threefold, first an increase in the number of decorated bowl forms - coarse shouldered bowls in calcite-gritted ware decorated with cabling on the edge of the rim or with finger-tip ornament on the shoulder, and bowls of finer burnished ware tempered with comminuted calcite grits, some angular in profile with straight inturned necks and flat or everted rims, others with curved profiles and upright, slightly flaring or outcurved rims; some find their closest parallels amongst Hallstatt D assemblages from the Low Countries (see, for example, Brewster, 1963, fig. 42.8; 50.1; 53.1).

¹Other assemblages which may be of similar date include those from Epperstone, Holme Pierrepont and Red Hill, Notts., and Billingborough, Lincs., phase 3.

Second, the occurrence in quantity of developed rim forms, such as the slightly beaded rims on biconical bowls (e.g. Brewster, 1963, fig. 35.4), and third an increase in the styles and quantity of decoration, with a proliferation in the use of finger-tipping and nail incision on coarse wares (on top of, inside and outside the rims, and on the rims and shoulders of the same vessel) and the use of linear incised designs on finer vessels. Sites which contain similar assemblages are discussed in considerable detail in Challis and Harding's survey (1975, 50-5) and will not be considered here, as the ironwork from this region is found on sites which have already been reviewed and from which independent dating evidence is available.

PRIMARY CATALOGUE

CASTLE HILL, Scarborough, Yorkshire

TA 051 891

0.2 hectares of the multiphase settlement complex on the Castle Hill headland situated beneath and considerably disturbed by a Late Roman signal station were excavated by F.G. Simpson between 1922-25, revealing a layer of prehistoric occupation cut into by 42 pits; both contexts seemingly yielded pottery, and bronzes of the Ewart Park industrial tradition. Further excavations were conducted by Rutter in 1953 immediately south of Simpson's excavations, revealing a further 4 pits. The sequence of occupation is impossible to unravel as the excavation records contained in Scarborough Museum are but scanty and preclude precise identification of the ceramic content of the pits. Such difficulties are compounded by the differing accounts rendered of the site's history which can merely be summarised here. R.A. Smith in his report in Archaeologia (Smith, 1928) reported that the bronzes, a Ewart Park assemblage discussed in the text, "were found on the level away from

the pits and possibly had nothing to do with the occupation in question (*ibid.*, 179) as represented by the pottery, the excavation of the pits and the deposition of their associated pottery being seen as a later event on the site. However, the excavator had assured Elgee (Elgee, 1930, 176) that "nothing could have been clearer than the association of the bronze objects with the same pottery as that in the pits. The bronzes were found lying scattered on the surface over which was scattered at least as much pottery as came out of the pits. Fragments from the surface fitted others from the pits. There can be no doubt that pots, pits and bronzes were all contemporaneous". Wheeler likewise comments upon the contemporaneity of the contents of the occupation layer and the pits (Wheeler, 1931, 20). As for the context of the iron, this too is in dispute; Wheeler avers that the "pin" (*ibid.*, fig. 16.12) came from one of the pits, but the record of pit contents makes no mention of this. The pottery is discussed in the text and hence need not be described here, but a list of the bronzes and other artefacts is provided below.

Yorkshire and plain socketed axes

triangular bladed tanged chisel

socketed gouge

2 nail-headed pins

awl

harness rings

plain bracelets

jet armlet

shale armlet and stopper

biconical spindlewhorls, two-edged with finger-nail impressions

fragments of a crucible

jet from bronze casting

glass and amber beads

pottery disc

3 iron fragments (Scarborough Mus.: 395.39 - 397.39)

Bibl.: Elgee, 1930
 Wheeler, 1931
 Smith, 1938
 Rutter, 1959

Mus.: Scarborough Museum

GRIMTHORPE, Millington, Yorkshire

SE 816 535

3.1 hectare univallate circular hillfort on western edge of the Yorkshire Wolds occupying the highest part of the chalk ridge between the Vale of York and Givendale. The site, first discovered in the nineteenth century, was rediscovered in 1958 by aerial photography and excavated in that year and again in 1961 and 1962. These campaigns revealed merely that continuous ploughing had damaged most of the interior of the site except the area behind the timber-framed box rampart in which postholes arranged both in a line and in groups of four were located. Excavation of the flat-bottomed ditch where it adjoined the causewayed entrance showed that it had been deliberately filled with material thought to be derived from the demolition of the bank soon after the formation of the primary silt; material from the rubble layer yielded a radiocarbon date of 970 ± 130 b.c. (NPL 137). A period of natural silting followed, prior to the formation of two layers containing occupation débris, Layers 4 and 5, the lower of which yielded a radiocarbon date of 690 ± 130 b.c. (NPL 136); the pottery and metalwork from these layers is discussed in the text, but the other finds comprised fragments of shale bracelets, sling stones, flint artefacts and worked and unworked animal bones.

Bibl.: Stead, 1968

STAPLE HOWE, Knapton, Yorkshire

SE 898 749

3-phase palisaded settlement on hog-backed hill on north slopes of the Yorkshire Wolds in Knapton Wood, East Riding of Yorkshire. Trial excavations were conducted in 1951 following the discovery of pottery in 1950, and total excavation of the site was carried out between 1951 and 1956, and subsequently in 1958. Excavation of the interior revealed three post-built huts, two circular and one oval, a posthole setting interpreted as a granary, other posthole emplacements and a crescentic semi-circular platform - the "quarried hollow" - while the defences consisted of three phases of palisades. The problems of relating the sequence of occupation to the metalwork and pottery are described in the text, as is the metalwork itself; a list of the latter is merely given here, figure references being to Brewster's illustrations.

Bronzes

double looped razor (61.1)

razor with recurved suspension loop (61.2)

crescentic handled razor with openwork blade (61.3)

fragmentary Sompting axe (62.9)

cup-shaped fragment (62.13)

120 convex-profile buttons with bar loops (63.2)

tanged chisel and fragment of another (61.5-6)

tweezers (61.4)

nail-headed pin (63.1)

2 awls (62.7, 8)

miscellaneous items (62.10, 11, 12, 14)

Iron

fragmentary curved rod (65.1)

iron ring (65.2)

other finds included jet and shale armlets, beads, rings and pendants, worked bone, trapezoidal loomweights, spindlewhorls (one edged with finger-tip impressions c.f. Needham and Longley

(1980, fig. 4.1) and flint and stone artefacts. Carbonised grain from the Quarried Hollow produced a radiocarbon date of (BM 63) 450 ± 150 b.c.

Bibl.: Brewster, 1963.

Mus.: British Museum

DISCUSSION

Discussion of the ironwork from this region will be extremely brief as only one of the three sites listed above, that of Grimthorpe, yielded secure evidence of iron in an early context, and that moreover is of a most unprepossessing nature, merely comprising a single strip of metal, perhaps a fragmentary blade, and a small nail (figure 3). The former was stratified between layers 4 and 5 in section W-X (area D) of the ditch, the latter in the upper of those levels, but both are considered to belong to a single phase of occupation (Challis and Harding, 1975, 33) which occurred late in the history of the site following the demolition of the rampart (which occurred soon after the formation of the primary silt) and a period of natural silting. A date for this phase is provided firstly by the radiocarbon determination of 690 ± 130 b.c. (NPL 136) quoted in the catalogue from the lower of the two levels and by the associated plain ware pottery from both contexts; the latter is made up predominantly of coarse barrel-shaped, carinated and shouldered jars, some with everted rims, mainly lacking decoration but with a few displaying cabling along the rims or with finger-tipping on rims or shoulders, the affinities of which have been discussed above. A ninth-eighth century B.C. date may likewise be applicable to the iron fragments

¹The other two iron artefacts from the site, an iron peg and an iron nail, are "unstratified" and "loosely stratified" respectively, and so have been omitted.

from Castle Hill, Scarborough, but on less secure grounds, for the actual location of the artefact is in dispute; nevertheless brief examination of the affinities of the bronzes and pottery from the settlement (see above, p. 245) suggested that neither need date later than the eighth century B.C., and thus the iron, by extension, may be accorded a similar date.

The iron ring and pin shank from Staple Howe, however, cannot be dated more precisely than to between the ninth and sixth centuries B.C. owing to the impossibility of determining an artefactual and occupational sequence on the site; much of the occupation débris occurred in derived contexts and it is clear, moreover, that extensive mingling of material from the multi-phase occupation has taken place (Brewster, 1963, 64; Challis and Harding, 1975, 6). Indeed, despite meticulous recording, the amount of information that can be derived from this site is minimal, scarcely more than that wrested from the All Cannings Cross report (see above, p. 101-2). The range of dates quoted above is derived from the currencies of the metalwork and pottery found on the site, artefacts in the former category which may date as early as the ninth century being the bronze tweezers, tanged chisels, awls, nail-headed pin and bronze ring, all frequent finds from Ewart-Park - Heathery Burn settlement contexts; one of the razors (Brewster, 61.2) may likewise date to the ninth-eighth centuries, belonging as it does to Jöckenhövel's "Nordischen Rasiermesser mit Zurück gebogenem draht förmigen Griff Fortsatz" with Montelius IV/V parallels (Jöckenhövel, 1980, Table 32, no. 608). Other items of metalwork are of Hallstatt C date: a razor of Bernissart type (Brewster, 61.1; Jöckenhövel, 1980, Table 35, §71; 174-5), a fragmentary Minot razor with openwork blade and

putative ring-handle¹ (fig. 8a; Jockenhovel, 1980, Table 26, 484; c.f. Table 25; 457, 458, 460; 135-6, 141), a cup-shaped moulding (Brewster, 1963, fig. 62.13) which may belong to a decorative harness panel such as was found in "Tombelle A", Court St Etienne, Belgium (Mariën, 1958, fig. 3.115), one hundred and twenty convex profile buttons with bar loops similar in form, and most importantly in size, to examples from Court St Etienne which are corroded onto Hallstatt C objects (Mariën, *ibid.*, fig. 117, 6) and a fragment of a Sompting axe (Brewster, 1963, fig. 62.9). As for the pottery it has already been noted that certain of the bowl forms find their closest parallels in Late Hallstatt assemblages in the Low Countries (see above, p. 248; Challis and Harding, 1975, 50). Scrutiny of the report reveals that the date of the two iron objects cannot be precisely determined from their contexts (the phase 1 palisade trench and a hollow on the floor of Hut III), and prudence thus demands that they merely be assigned to the three century span quoted above².

¹The fragmentary nature of the items precludes certainty, but it appears to resemble a miscast rather than a broken artefact, excess bronze perhaps having been poured into the possible ring-handle section of the mould (c.f. Ugley, Essex; B.M. 1937, 1-7, 1; Runnymede, Surrey; Longley, 1980, fig. 11.6), thus raising the possibility of on-site metalworking.

²The following two sites are not deserving of inclusion in the primary catalogue, and in fact merely merit mention in a footnote. In the case of Ball Cross Farm, Derbyshire (J.D.N.H.A.S. 1954, 85-99) the small fragment of iron slag derives from a section across the rampart which failed to produce pottery, while the details given in the report prevent the extrapolation of a secure date from the pottery stratified elsewhere on the site. Lack of precision in the excavation and reporting of deposits at Harborough Cave, Brassington, Derbyshire examined in 1890, 1907 and 1922 (D.A.J., 1890, 108-38; P.S.A.L., 1908, 129-45) hinders the determination of the associations of the Later Bronze Age - Early Iron Age pottery; iron slag was indeed found in a seemingly early context, but the occurrence of such later metalwork as a ring-headed pin and La Tène II fibula on similarly early floors must also be noted.

THE TYNE-TAY REGION AND HIGHLAND SCOTLAND

In describing the remaining two areas, the Tyne-Tay region and that of Highland Scotland, a different format to that used previously will be adopted in order to accommodate, and to highlight, the differing nature of the evidence; so scanty is it, and its dating currently so fraught with difficulties as to defy chronological ordering, that summary descriptions are deemed more appropriate than the method used in previous sections which would run the risk of according spurious accuracy to ill-deserving material. The amount of ironwork from the two areas which can confidently be attributed to the period under discussion is minimal, but nevertheless merits attention for the sake of completeness in this study.

Despite a lengthy history of fieldwork and excavation having been conducted in the Tyne-Tay area, most notably the excavations of Childe, Curle and Cree in Mid and East Lothian in the early decades of this century, the work of the Royal Commission on Historical Monuments (Scotland) in Roxburghshire, Selkirkshire and Peeblesshire, Mrs. Piggott's Border excavations in the late 40's and early 50's and those of Jobey in Durham and Northumberland from the later 50's onwards, understanding of the later prehistory of this area is currently in a state of flux. Ideas about cultural boundaries (Piggott, 1968; MacKie, 1969; 1970; Ritchie, 1970), settlement sequences (Piggott, C.M. 1947-8) and artefact typologies (Stevenson, 1968) formulated and unquestioningly upheld in the 40's, 50's and 60's have collapsed in the face of the results from a massive spate of excavations undertaken since 1965 (Cunliffe, 1983, 92), and substitute hypotheses are still in the process of being tested (Hill, 1982a; 1982b; Harding, 1982b; Cool, 1982). Much has been written on this topic in recent years and the reader is

referred primarily to the proceedings of two conferences published as Harding (1982a) and Chapman and Mytum (1983); here one point alone will be examined, namely the difficulty of assigning accurate dates to material of the first millennium B.C. from this region in the present climate of understanding.

The demonstration that settlement types may have had longer currencies than hitherto realised (Jobey, 1968; MacKie, 1969), that these currencies, rather than occurring in strict succession, may have overlapped, and that the resulting patterns may differ from area to area according to land-use, availability of raw material or even for less tangible reasons (Jobey, 1971, 91-3), has meant that it is now impossible to treat settlement forms as precise chronological indicators. - as was the case when they could be assigned to a narrow horizon within the simplistic structural sequence based on Mrs. Piggott's excavations at Hownam Rings, Roxburghshire (Piggott, C.M., 1947-8). Timber palisades, to cite but one example, have been shown to occur from the early first millennium B.C.¹ to the Roman period and beyond, and to be used for a variety of settlement types from fortified hilltop enclosures to smaller rectilinear palisades enclosing sunken yards (Gates, 1983). Nor need the succession necessarily be one of small, unenclosed, settlements to larger, enclosed sites; on the contrary, the palisaded fort at Craigmarloch Wood, Renfrewshire was replaced by a smaller univallate timber-laced fort (MacKie, 1969, 18) and the enclosed settlement at Dryburn Bridge, East Lothian by unenclosed ring-ditch houses (Triscott,

¹Sites at the early end of the sequence include the following:

Forest of Ae, Northumberland ("c. 1000 b.c."; Clack and Gosling, 1976, 24)
 Fenton Hill, Northumberland (Har 825: 690 ± 110 b.c.)
 Huckhoe, Co. Durham (GaK 1388: 510 ± 40 b.c.)
 Craigmarloch Wood, Renfrewshire (GaK 995: 590 ± 40 b.c.)
 Burnswark, Dumfriesshire (GaK 2203b: 500 ± 100 b.c.)
 Doon Hill, East Lothian (Hope-Taylor, 1966), demonstrates the continuance of the type into the post-Roman period.

1982, 119). It is to be hoped that a framework of local structural sequences will soon be established, based upon batches of radiocarbon dates from enclosure forms or house-structures, and indeed advances are being made in this area (Hill, 1982a). But that is not of concern here, the point of the foregoing being rather to indicate the impossibility of using settlement forms as anything other than relative dating tools within a local area.

Ascription of precise dates on the basis of artefactual comparisons is likewise fraught with difficulties, material remains being both scanty and singularly unhelpful. The pottery in particular is of little cultural or chronological significance, comprising simple undecorated bucket-like forms with long currencies (e.g. "Flat Rimmed ware"; "Dunagoil ware"); indeed, Jobey has commented that "the forms are so basic and unsophisticated, and the pottery so crude, that quoting parallels may be not only useless but even dangerous" (1970, 73-5; see also Jobey, 1959, 230-1, 264). Recent research indicates that such attitudes may be over-pessimistic and that it is possible to isolate assemblages of artefacts in use at different times (e.g. Cool's Early, Middle and Late assemblages; Cool, 1982), but only provisional results are available at present. Moreover, it would appear from such work that the period under discussion, at least in South-East Scotland, was aceramic, the main finds being saddle-querns, pebble rubbers and a variety of miscellaneous stone objects such as roughly-worked stone bowls.

It is my contention that it is impossible to date any of the ironwork or metallurgical debris from this area securely to the early centuries of the first millennium B.C. in the absence of relevant radiocarbon dates or diagnostic bronze artefacts, the only aids to dating, those of context and ceramic associations, being deemed useless as argued above. Some

of the evidence may even be earlier than originally thought, the classic and tantalising example being that of the two bowl furnaces from West Brandon, Co. Durham, excavated by Jobey in 1961 (Jobey, 1962). The settlement consisted of three phases, a small unenclosed round-house, followed by larger round-houses set within a double palisaded sub-rectangular enclosure, and later within a ditched enclosure. The two furnaces were of similar size, thirty centimetres in diameter and twenty centimetres deep, the eastern one having a slight groove on the edge of its bowl, probably for a tuyère; in their bases lay a lining of oak charcoal and slag droplets covered by runnels of slag, which in turn were capped with irregularly-shaped fragments of clay furnace lining, vitrified on the inside, presumably the residue of the domed clay furnace covers used in the final smelt. It would appear that these were in use during the occupation of the palisaded homestead, this on the evidence of the presence of large fragments of clay lining from the western furnace deeply stratified in the replacement palisade (Jobey, 1962, fig. 6). On the basis of the currency of palisaded settlements upheld in 1961 and that of the "coarse undecorated handbuilt pottery" found therein¹, likened to that from the earlier phases of Hayhope Knowe and Hownam Rings, Roxburghshire, a date in the second or third centuries B.C. (*ibid.*, p. 29) was assigned to this phase; MacKie has pointed out, however (1979, 296), a much earlier date may now be suggested, perhaps one as early as the ninth century B.C. - but this, alas, remains mere speculation.

¹The 15 fragments are tiny and only one is a rim-sherd, of plain rounded form; the remainder are all wall-sherds, not large enough to show any form. The remaining artefacts are all of stone - querns, rubbers, pounders and a disc - and advance the quest for chronological precision but little.

The lengthening of the currency of palisades has also confused the dating of the iron pin-like object and slag found beneath the Phase II drystone revetted wall at Hownam Rings, Roxburghshire (Piggott, C.M., 1947-8), which succeeded a free-standing palisade set in a bedding trench and was followed by a multivallate earthwork, for such chronological reassessment indicates that the defensive sequence may have spanned six or seven hundred years rather than the two to three hundred envisaged in the report (Hill, 1982a, 5-6); here, too, the ceramic evidence is of little help in clarifying the date of the ironwork.

In the case of three further sites the location of the iron objects or débris in question is clearly so dubious as to render dating impossible on stratigraphic grounds, let alone those detailed above. At Ell's Knowe, Northumberland, excavated by the University of Newcastle in 1970 and 1978 (Burgess, 1978, and in a letter, January 1981), a palisaded enclosure consisting of a double palisade reduced to a single line on the steep eastern side of the promontory was succeeded by a multi-ramparted promontory fort, the innermost of the three stone ramparts overlying the line of the earlier palisades. A lump of slag or "furnace débris" recovered in 1970 from "the top of one of the palisade lines" (and now sadly missing) was originally assigned to the early phase, but the later excavations removed such certainty, the possibility thereby arising that it belongs rather to the second phase of activity on the site, the date of which cannot be deduced from the information contained in the interim report and which will only become apparent with the publication of the final report¹. Similarly, at Ingram Hill, Northumberland, a site examined

¹The hilt and upper blade of an iron sword were discovered in the interior of the site in disturbed conditions, but no further information about these is currently available.

by Hogg in 1939 and 1948, and later by Jobey (Hogg, 1942; 1956; Jobey, 1971); one of the palisade trenches of the earliest phase of occupation, trench 3, was directly overlain by the bank of a multi-vallate enclosure, charcoal from the base of which gave a radiocarbon date of 220 ± 90 b.c. (I 5316). It was reported that some fragments of iron slag and a few wall sherds of coarse pottery occurred low down in the make-up of this bank, and thus it is difficult to prove unequivocally that another fragment of slag, supposedly used in the packing of palisade trench 3, belongs to the primary enclosure phase; again, the absence of diagnostic finds from the latter phase prevents the ascription of a date to the slag on independent grounds, the only firm piece of evidence being the *terminus ante quem* date for the construction of palisade 3 provided by the radiocarbon determination cited above.

The third instance of the way in which stratigraphic uncertainties preclude the accurate dating of ironwork to the period under discussion is taken from the site of Traprain Law, East Lothian, and this, being the best-known and most frequently cited of the three, demands closer scrutiny. The hillfort has been frequently examined, for instance by Cruden, Bersu and Feachem (Jobey, 1976, 191), but the excavations of relevance here are those of Curle and Cree between 1914-1915 and later from 1919 to 1923 on the western shelf of the hill. The difficulties of interpreting the results of these campaigns are notorious (Burley, 1955-6, 119-20; Jobey, 1976, 191), arising from the excavators' practice of working in arbitrary levels on an unevenly sloping hilltop (Curle and Cree, 1920-21, 162; Cree and Curle, 1921-2, 206), and their failure to compile their annually changing numbering system for such levels. Mingling of the finds from different occupations naturally occurred, and indeed is admitted in the reports of the 1919, 1920 and 1921 seasons

(Curle, 1919-20, 67; Curle and Cree, 1920-21, 167, 194; Cree and Curle, 1921-22, 191); thus the lowest level of areas I, J, K and L, for instance, excavated in 1920 (Curle and Cree, 1920-21, 169-176), contained not only such later Bronze Age types as a tanged chisel, bronze punches and jet armlets, but also fibulae, penannular brooches, glass armlets and beads, and 1st and 4th century A.D. coins, while Jobey (1976, 191) has pointed out that fragments of a single Roman vessel are to be found on three levels in adjoining areas.

It is, however, the areas Ha and M that bear the closest investigation, for these yielded the densest concentration of Late Bronze Age - Early Iron Age artefacts - clay moulds including one for a Ewart Park sword, socketed and tanged knives, a tanged chisel, socketed gouge, penannular armring, lock ring, socketed axes, nail-headed pins and amber, shale and jet artefacts - as well as possible settlement traces. The latter, deemed "unenclosed", (as it is impossible to relate them to the sequence of defences on the hill without further investigation), comprised an area of paving surrounded by stones with an entrance on the west; to the east of these ran a diagonal setting of stones backing onto a terrace retained by a wall against which was built an enclosure containing a cache of barley (Cree and Curle, 1921-22, 201-6). It is important to note that none of the finds (three socketed axes, a saddle quern and the barley), usually reported as being associated with the "hut", came directly from it, but merely lay in the vicinity; given the uncertainties of the excavation techniques it is prudent not to claim such an association.

Prudence is also required in determining the date of the iron looped socketed axe found in this area (Plate 9; Cree and Curle, 1921-22, fig. 17) for while it is closer to its supposed bronze templates than the other fifteen examples known from the British Isles (Manning and

Saunders, 1972, 280; fig. 4, no. 11) and might thus be considered on typological grounds to date to the Late Bronze Age - Early Iron Age transition, it is impossible to confirm this on stratigraphic grounds. The axe apparently derived from layer 6 in area M, a context which yielded no further bronze implements, merely two moulds for casting a socketed axe and a lunate-opening spearhead (Cree and Curle, 1921-22, fig. 14); the bronzes which are generally thought of as having been associated with it - three socketed axes (*ibid.*, fig. 11), a harness ring (fig. 16), three nail-headed pins (fig. 12, 1-3) and a Hallstatt C bronze razor (fig. 12.4)¹ - derive from level 6 in the neighbouring area, area Ha, a layer which also contained glass beads (*ibid.*, 219), probable evidence of the mixing of material commented upon above. Moreover, not only did the layer which directly overlay M6, M5a, contain evidence of much later, possibly second century B.C., occupation in the form of glass armlets, a bronze needle, an ox goad, pin (*ibid.*, fig. 20/1) and clamp (fig. 13/2), but it is clear that the excavators found difficulty in detecting stratigraphic differences in these areas (*ibid.*, 201). To aver that the context indicates a seventh century B.C. date for this axe in the light of such uncertainties is clearly unwise; it has rather to be admitted that precise dating of this example, as with that from Bishop's Loch, Old Monkland, Lanarkshire (Cree and Curle, 1921-22, 217; Manning and Saunders, 1972, 290; MacKie, 1976, 229) and the examples from Highland Scotland to be discussed later, is impossible.

¹Close scrutiny of the artefact (N.M.A., 1922, 237; my figure 8b), generally described as a single-looped razor, reveals that it originally had two loops and thus is of Jöckenhovel's type "mit seitlichem griff" (Jöckenhovel, 1980, 193, 197; Taf. 40, no. 776). I am indebted to Miss Close-Brooks for alerting me to this fact in 1981 - and now see Close-Brooks, 1983).

In the case of four further sites lack of analysis or misidentification negates the value of the supposed evidence. At Kaimes Hill, Midlothian, excavated by Childe in 1940 and by Simpson between 1964 and 1968, the dry-stone revetted rampart of Phase 2, which produced a radiocarbon determination of 365 ± 90 b.c. (GaK 7971) and was associated with artefacts belonging to Cool's Middle assemblage (Cool, 1982, 99), was preceded and in some areas underlain by a timber-laced defence, the core of which contained occupation débris, animal bones and "slag": the nature of the latter is not specified in Simpson's report (Simpson, 1969) nor apparently was the material subjected to any form of analysis. The supposed iron fragments from the first phase of the timber-framed fort at Sheep Hill, Dunbartonshire, associated with Late Bronze Age mould fragments, turn out to be merely iron pan traces (MacKie, 1966, 24-5; 1967, 25; 1976, 211-4) and it is likely that a similar explanation applies to the so-called "iron rivets" in the pegged leaf-shaped spearhead in the recently discovered Late Bronze Age hoard from Gilmonby, Bowes, Co. Durham¹; not only does the spearhead in question (fig. 7) display signs of an orange-tan deposit over a wider area of the socket-mouth than merely around the peg-holes, but further artefacts within the hoard, such as certain of the socketed axes and a sword fragment, also display such a coating - but certainty is impossible prior to analysis. Finally, the ascription of a Hallstatt C date to the iron spearhead from one of the huts within the palisaded, and later embanked, enclosure at Hayhope Knowe, Roxburghshire (Piggott, C.M., 1948-49, fig. 10.58; my Plate 10),

¹I thank Colin Burgess for notifying me of this find and Denis Coggins for permitting access both to the hoard and to information regarding its discovery.

originally a suggestion of Stuart Piggott's which has since become formulaic (Ritchie, 1970, 53; Burgess, 1979, 274; Ralston, 1979, 451), ought to be examined. Lozengic-sectioned blades are neither "typical" of Hallstatt C spearheads (as the list below demonstrates¹) nor date exclusively to that period, while the very paucity of spearheads in Western European Hallstatt C contexts should also militate against such a date; moreover, the suggestion that the Hayhope example represents the experimental product of a local industry is not as plausible as in the case of the Llyn Fawr or Melksham examples.

It has been argued that none of the evidence cited above points conclusively to the use of iron in the early centuries of the first millennium B.C. in South-East Scotland and Northern England, but such a hiatus may be illusory, caused by the quality of the evidence and the current state of our understanding of the later prehistory of this area; only further excavation and meticulous recording leading to clarification of the local cultural sequences and strengthening of the chronological framework by means of groups of radiocarbon dates will determine whether the lack of iron is indeed real or merely a function of these deficiencies. Indeed, such advances are already being made; excavations at Broxmouth hillfort, Dunbar, East Lothian (Hill, 1982c) between

¹Study of Kossack's catalogue of Hallstatt material in Southern Germany (Kossack, 1959) indicates firstly that iron spearheads are not common in Hallstatt C₁ contexts, becoming slightly more frequent in HaC₂ and more so in HaD, and secondly that flat and lozengic-sectioned blades, as well as examples with pronounced midribs, occur in Hallstatt C contexts; for an impression of the variety see the following: Kossack, 1959, Taf. 35; 15, 16; 54, 10; 97, 20-1; 115, 4; 117, 11; 118, 7; 121, 1). Moreover, in comparison to those examples with lozengic-sectioned blades from Western Europe definitely dated to Hallstatt C - that is, omitting the Melksham examples - the Hayhope example in a much slighter weapon, its estimated length being less than 15 cm, the average length of the others being 25 cm. If "length of weapon" rather than "shape of blade" had been the trait chosen by Piggott, such a comparison would not have been made.

1977 and 1978 have revealed plentiful evidence of ironworking in secure contexts belonging to the pre-defensive settlement phase, phase II, charcoal from which yielded a radiocarbon determination of 425 ± 60 b.c. (GU 1358; but see Ashmore and Hill, 1983, 93), while the nearby site of Dryburn Bridge, East Lothian (Pollock and Triscott, 1980, 369; Triscott, 1982; Hill, 1982a, 26) also produced metalworking débris¹ in association with a ring-ditch house, the dates of which lie between 665 ± 55 b.c. and 330 ± 55 b.c. - and the final reports of other settlements of this period are shortly expected (e.g. Kendrick, forthcoming: Douglasmuir, Angus). Discussion of the introduction of iron to the Tyne-Tay region, if it is to be of any value, must await the publication of such sites.

The evidence from the remaining area, that of Highland Scotland north of the Tay-Clyde boundary, comprising Piggott's Atlantic and North-Eastern Provinces (Piggott, 1968, fig. 1; Ralston, 1979, 446-8) will be dealt with equally briefly, current understanding of the later prehistory of this region being as sketchy as that of the previous. Here, too, research is currently in a state of flux, long-accepted theories about the chronology of settlement types having recently been overthrown by the results of such excavations as those at Finavon, Angus, Dun Mor Vaul, Tiree, Bu Broch, Orkney and The Howe, Orkney (MacKie, 1969; 1974; Hedges and Bell, 1980a, 90; Hedges and Bell, 1980b, respectively) but not yet replaced by a firm framework. Moreover, the pottery from this region is in urgent need of detailed attention, for at present its dating is very imprecise; much of the West Coast

¹Reports vary as to the nature of the "slag" and the results of the analyses are eagerly awaited.

material, for instance, is merely assignable to a "Late Neolithic - Iron Age" span (MacKie, 1962-63, 172-3) while Ralston has recently admitted the possibility that the so-called later prehistoric assemblage from the earliest, palisaded, phase at Green Castle, Portknockie, Banff, once likened to Cunliffe's West Harling - Staple Howe ceramic group (*sic.* Ralston, 1979, 457) may rather prove to be of Pictish date (Ralston *et al.*, 1983). Even Coles' Late Bronze Age metalwork scheme (Coles, 1959-60), unquestioningly accepted for so long, clearly requires to be overhauled and replaced by one which eschews time-lag, is composed of coherent and convincing industrial traditions and allows for differing rates of local metallurgical development.

In the absence of relevant radiocarbon determinations, such an inability to assign precise dates to material found in association with ironwork is highly problematic, militating against the worthwhile consideration of the evidence from such sites as Wiltrow, Shetland (Curle, 1935-36, 153-69)¹ and Loanhead of Daviot, Aberdeenshire (Kilbride-Jones, 1936-37, 401-5). Study of the earliest ironwork from this area, however, is further hampered by imprecisions in both excavation and recording on sites which do contain closely datable material, rendering even more evidence useless, as the following examples demonstrate. The occupation site on the sand-dunes at Balevullin, Tiree, excavated by Henderson Bishop in 1912 and published by MacKie fifty years later (MacKie, 1962-63), would appear at first to yield a fascinating association, containing as it does a large assemblage of coarse, gritty barrel, bucket and S-shaped vessels, some bearing bevelled rims and incised cordons, which Challis and Harding have compared to material

¹ The results of analyses of slag samples from this site are contained in Appendix III.

from Mam Tor, Derbyshire (Challis and Harding, 1975, 34-5), as well as iron fragments and slag, seemingly from the same "Hut". Sadly, however, the only information available about the latter's provenance is that provided by a finds label which ascribed a miscellany of material, including the iron, to "the number 1 Hut", clearly insufficient information, especially in the case of a sand-dune site; doubt must therefore be cast on the association of pottery and iron (*pace* MacKie, 1962-63, 163; 1974, 77) and the evidence ignored. A second highly dubious association is that sometimes claimed between a lump of iron slag and Late Bronze Age moulds from Village I - the unenclosed settlement of oval stone houses with concave bays - at Jarlshof, Sumburgh, Shetland. The slag was found in the lowest level of chamber "p" in Dwelling III (Curle, 1933-34, 230-51, 303; later called "Dwelling IVa", Hamilton, 1956, 24-5) directly associated with several pieces of quartz, animal bone, a rim sherd and stone artefacts, while from the equivalent primary level in another chamber (chamber "b") came a mould for a Ewart Park sword and a pouring gate (Hamilton, 1956, fig. 14.3 and 5); further contemporary evidence for the casting of Later Bronze Age artefacts derives from the third phase of Curle Dwelling I/Hamilton Dwelling III which contained matrices for faceted axes, Ewart Park swords, a sunflower pin and a possible tanged chisel¹. However, quite apart from the fact that the slag was never subjected to analysis, is no longer extant and received no mention in Hamilton's synthesis of Curle's excavations (Hamilton, 1956, 21-4), scrutiny of the reports suggests that chamber "p" was heavily disturbed by two phases of subsequent rebuilding - Hamilton Dwelling IVc moreover lies directly above it - as witnessed

¹The description of the latter as the matrix for a gouge has become entrenched in the literature and ought to be questioned.

perhaps by the occurrence of a rim sherd (Curle, 1933-34, fig. 42.2) in the primary level of that chamber which is in a fabric alien to that commonly used in the phase 1 occupation; it is thus likely that the slag, if indeed it is such, is intrusive, deriving from the Village II occupation¹. Even the oft-quoted find of an iron ring from the Balmashanner hoard, Angus (fig. 3; Pl. 11) is somewhat dubious owing to the method and antiquity of its retrieval². The object was recovered in 1892 during ploughing, apparently associated with a "hoard" of bronze, gold, amber and jet artefacts, the closest parallels for which are found in assemblages of the Ewart Park, Heathery Burn and early Dowris industrial phases and Late Urnfield/Montelius V contexts in North Germany and North France, as well as with sherds of culturally undiagnostic coarse bucket-shaped pottery (Anderson, 1891-92, 182-8; Coles, 1959-60, 98-9; O'Connor, 1980, 193; 212-3). While the find is here tentatively ascribed to the ninth-eighth centuries B.C., it is wished, in view of the important rôle it has now assumed in any study

¹One fragment of iron slag can with confidence be assigned to Village II but its date, alas, is impossible to determine. Burgess has argued that the ironworking so demonstrated dates to his Llynfawr phase (Burgess, 1979, 274) but scrutiny of the reports reveals that such an opinion is impossible to substantiate. The slag in question derives from the soutterain attached to Hamilton Dwelling IVc (Village II) and was neither associated with, nor can be stratigraphically linked to levels containing, Late Bronze Age mould material. Admittedly, Dwelling IVc succeeds Dwelling IVb which contains such moulds but the interval between the two cannot be determined, nor, given the current state of pottery studies mentioned above, does the associated pottery (Hamilton, 1956, 19) help to clarify the date.

²XRF analysis has recently confirmed that the object is indeed iron. I thank Dr. J. Tate of the N.M.A.S. Laboratories for carrying out this test, the result of which is detailed in Appendix III.

of this topic, that a more detailed, first-hand account of its discovery had been available¹.

It will be clear that such deficiencies in excavation and recording hinder the study of early iron use in this region, but problems occur even in interpreting the results of sites which have been meticulously examined and published in great detail, chiefly owing to the very paucity of material remains retrieved therefrom. Take, for example, the site of Finavon, Angus, a 0.5 hectare timber-framed hillfort on a steep ridge in the eastern part of the Central Lowlands excavated by Childe between 1933 and 1935 (Childe, 1934-35; 1935-36) and reinvestigated by MacKie in 1966 (MacKie, 1969, 16-18; 1976, 210-1). Two iron objects, a ring and a "hopeless corroded blade" (*sic*) were recovered from the earlier campaigns both apparently from rampart tumble from the northern timbered defence², but a date for these cannot be extrapolated from the other finds from the rampart sections excavated, as these merely amounted to a few culturally undiagnostic flint and stone artefacts and some sherds of thick, coarse, buff-coloured pottery containing lumps of gravel in their fabric. MacKie's investigations of 1966 have helped to determine the span of occupation on the site - radiocarbon

¹Lack of information about the methods of discovery and contexts of the three iron looped and unlooped socketed axes from this region, those from Rahoy, Morvern, Argyll (Childe and Thorneycroft, 1937-38, fig. 9; Manning and Saunders, 1972, 285-6, fig. 4.10), Inveran, Gairloch, Rosshire (Dixon, 1886, 73; Discovery and Excavation, 1967, 47; Manning and Saunders, 1972, 286) and Culbin Sands, Morayshire (Rainbow, 1928, no. 10; Manning and Saunders, 1972, 286) likewise precludes discussion of their date; the first, from a vitrified dun which also yielded a La Tène I fibula, was insecurely stratified while the latter two were simply stray finds.

²While the location of the blade was given as "in the area near hearth C", that is, directly behind the north rampart, in the absence of any indication of it having been securely stratified in the hearth or in any occupation level, it seems prudent to attribute it to rampart collapse, such activity having disturbed the entire area (Childe, 1934-35, 63).

dates¹ elicited from samples stratified in the southern rampart, the sequence of which appears to be identical to that of the northern rampart, indicate that the fort may have been founded as early as the eighth-seventh centuries B.C. (MacKie, 1976, 226) and continued to be occupied until the fourth (MacKie, 1969, 18) - thus placing the objects within a broad date range, but clearly this is not adequate.

The most recently excavated site in this region to yield evidence of early iron is that of Castle Point, Cullykhan, Troup, Banff, a 1.3 hectare promontory fort overlooking the Moray Firth; even the value of this material, though, is diminished by inconsistencies in the various reports of Greig's campaigns in the early 70's (Greig, 1970; 1971; 1972; Ralston, 1979, 456-7; Ralston *et al.*, 1983, 162-3), inconsistencies, moreover, which prove impossible to disentangle conclusively owing to the omission of the necessary sections or plans in any of these reports. The difficulties are two-fold, first the notorious problem of attempting to tie in occupation phases in the interior of a site with multi-phase defences, and second the lack of any clear distinction being made in the reports between these occupation deposits, in places up to thirty centimetres thick. The first task will not be attempted here - for that, see Ralston *et al.* (1983, 162-3) - but some unravelling of the second is required. The interpretation which appears to fit the evidence most neatly is that the "domestic and industrial occupation" in the northern part of the site should be separated into two phases (*contra* Greig, 1972, 229-30), with traces of domestic evidence including a hut, jet bracelets,

¹GaK 1224 - 590 ± 70 b.c. - from timbers laid down during the building of the timber-framed defence. GaK 1223 - 320 ± 90 b.c. - associated with occupation overlying these timbers. GaK 1222 - 410 ± 80 b.c. - from low in the fallen rampart rubble.

sherds of coarse, high-shouldered vessels, beads and sandstone spindle-whorls being stratified below an area of cobbling, the surface of which contained traces of both iron and bronze-working. The metallurgical evidence is fascinating, comprising bowl-furnaces containing wood charcoal and iron slag, a metallurgical hearth beside which lay a handled crucible which bore tong-marks on its surface, further crucible fragments, two iron objects, one of which resembles a chisel, and a bronze tanged chisel. Given the dangers involved in attempting to determine the date of these occupation layers using the radiocarbon determinations from the three-phase defensive system, and given that the domestic evidence is here viewed as preceding the metallurgical débris, the date of the latter is thus dependant on that of the bronze tanged chisel. These chisels, that is those characterised by the presence of a definite demarcation between the blade and the square or rectangular sectioned tang, have a long currency in the British Isles, occurring first in such Wilburton hoards as the eponymous Cambridgeshire hoard or that from Isleham, Cambs., and continuing into the seventh century as witnessed by the Brogyntyn, Salop. association; their currency in Scotland is harder to define, but may stretch from the ninth/eighth centuries B.C., if O'Connor's backdating of the Adabrock hoard, Lewis, is accepted¹,

¹ Coles (1959-60, 48-50) maintained that the Continental parallels for the sheet bronze vessel found in that hoard, assigned to von Merhart's B2b category by Piggott (1952-53, 185), date to Hallstatt C. O'Connor on the other hand, while upholding Piggott's ascription, argued that such vessels occur rather in Late Urnfield (MV and HaB3) contexts, and that since the remainder of the artefacts in the hoard have parallels in the Ewart Park - Heathery Burn industrial traditions, there is thus no need for the hoard to be dated so late, nor for it to lend its name to a Scottish Hallstatt C metalwork tradition (*pace* Coles, 1959-60, 55). As for the end of the tool type's currency, it is difficult to prove conclusively that such chisels were still in use in Hallstatt C contexts, in Scotland as in England, owing to the difficulty of demonstrating associations on badly stratified multi-phase settlement sites, but the examples from Traprain Law and Staple Howe are commonly, if insecurely (see above, pps 254, 262) cited as such.

into the seventh. Thus, in this case as with that from Finavon, only a range of dates can be offered with which to date the iron; clearly much research is needed into later prehistoric assemblages from Highland Scotland before study of the transition from bronze to iron can be placed on a firm basis.

SECTION III

RETROSPECT AND PROSPECT

CHAPTER 3

Appraisal of the Evidence and Conclusions

PART I: Appraisal of the Evidence

The principal aim of this thesis is to list the occurrence of iron in secure Late Bronze Age contexts in Great Britain, thus enabling discussion of that metal's adoption to be founded on a firm basis. In the compilation of the Primary Catalogue a rigorous approach was therefore adopted, one which eschewed the acceptance of badly-stratified or loosely associated material, attempted to avoid the pitfalls of misidentification and sought to question the integrity of long-accepted evidence. In doing so it became clear that four problems in particular bedevil the study of this topic - as indeed that of other aspects of the material culture of the earlier first millennium; these deserve summary recapitulation, if only that ways of combating their effects may be suggested.

The first concerns the source of much of the evidence, namely excavations conducted during the early decades of this century; the limited extent of many of these campaigns, lack of detailed recording, indeed sometimes of initial recognition, of stratigraphic relationships thereon and somewhat cavalier treatment of the finds and their registration thereafter, severely limits the value of the evidence extracted¹. Such lacunae have occasioned the relegation of much hitherto unquestioned evidence to the Secondary Catalogue, sites of such potential interest as All Cannings Cross, Wilts., Dinorben, Denb. and Traprain Law, East Lothian. Re-excavation is clearly impossible in some cases (where the site has been destroyed by subsequent activity or by that of the original

¹To be fair, such criticisms apply not merely to early campaigns; it will have been evident that numerous more recent excavations also err in these ways, chiefly in the manner of their subsequent publication.

excavator) but in others it is both feasible and desirable; it should for instance be possible on those areas of the former site untouched by Mrs. Cunnington, the deposits having been protected by hillwash, while Close-Brooks has recently pointed to the existence of an area within the ambit of the Later Bronze Age occupation at Traprain Law which has escaped the ravages of the encroaching quarry, and those of Curle and Cree, its existence having remained hitherto unrecognised owing to the misplaced plotting of the latter's trenches from aerial photographs (Close-Brooks, 1983). Re-excavation on these sites, conducted and published to a high standard, might do much to redress the harm effected by the previous campaigns by elucidating much-needed sequences, the value of such retrospective exercises having been demonstrated by Alcock's section of 1973 at Cadbury Castle, Somerset (Alcock, 1980). Nor need excavation be the only tool, for in those cases where the documentation is adequate - sadly, in my experience, all too few - re-examination of material in museum storerooms proves invaluable, as Champion has shown with regard to the Kentish sites of Minnis Bay, Mill Hill and Milner's Gravel Pit, Sturry.

The second problem concerns the use of radiocarbon dates, tools which have been avoided as far as possible in this thesis when constructing local chronological sequences. The vagaries of the calibration curve with regard to the period under discussion are well-known and need no repetition here, being adequately summed up in Bailey and Pilcher's recent dismal statement:

"It is impossible to resolve sensibly the radiocarbon dates of any samples whose true ages lie between 400 and 800 B.C.. This is a catastrophe for Late Bronze Age/Iron Age archaeology although one which has been predicted for some time".

(Bailey and Pilcher in
Ottaway, 1983, 58)

It is well to point out, however, that the existence of multiple dates from well-stratified contexts on the same site or from widespread associations of a similar nature would do much to redress such drawbacks, but, sadly, few such series are currently available¹. In many cases we are reliant upon a single date for a multi-period site (e.g. Staple Howe, Yorks.) or for an entire pottery tradition (e.g. the plain ware tradition in Northamptonshire), dates which moreover entail a quantifiable uncertainty of around ± 150 b.c. or even ± 250 b.c., thus providing a range of dates (within which the true value may be said to lie with a measure of statistical confidence) which span up to half a millennium in calendar years. Clearly until sequences of "high-precision" (low-cost) dates are attained, and a single calibration curve is ratified for general use, such tools are best ignored.

The construction of artefactual sequences allows finer resolution, but here too problems abound, that which has clearly been the most harmful to the topic under discussion being the propensity to accord undeserved authenticity to doubtful associations. In the light of the doubts raised about the contexts of the Llyn Fawr and Melksham deposits, it is urged that greater consideration be given to the means of deposition of votive associations and hence to their value as chronological building blocks. Indeed, to be scrupulous, even the value of metalwork traditions as chronological aids is now being brought into question by Bronze Age specialists who increasingly dispute the sequential nature of current metalwork schemes for the Later Bronze Age, and adopt an ever more minimalist view of their "supra-local" chronological significance (as

¹The British Museum's programme (Burleigh *et al.*, 1981, 14-23) is doing much to improve this situation and, it is hoped, will continue to do so.

witnessed during the discussion at the Prehistoric Society Seminar, November 1983). Until the previous means of dating is improved, however, we can do no other but invest the metalwork with such chronological meaning, while trying always to bear in mind the proviso that metalwork, when considered in isolation, is not a suitable medium from which to speculate broadly about chronological and cultural distinctions, its manufacture being influenced so variously from area to area by such factors as accessibility of raw materials, forms of industrial organisation, local conservatism and the capacity to assimilate influence from outside.

The fourth and final problem is that of the reiteration of descriptions and opinions without the authentication of first-hand examination. It would be captious to repeat the examples cited above, but it will have been clear that much of the oft-repeated data is indeed spurious, serving to inflate greatly the body of evidence listed in discussions of the adoption of iron. Clearly, first-hand examination of the evidence is not always feasible in archaeological scholarship, but the constant reiteration of suggestions which then harden into dogmatism, or of opinions which then give rise to "facts", can and should be guarded against. With reference to the study of iron in particular, the principal pitfalls are the failure to distinguish between ferrous and non-ferrous slags, many of the putative examples being merely the residue of molten or organic material (Lidbury, Figsbury and Boscombe Down East, Wilts.), the difficulties of distinguishing between exiguous traces of metallic iron and the effects of iron-rich concretions or panning in the subsoil (see Keeley and MacPhail, 1981, 236; e.g. the Sompting axe, Gilmonby spearhead, Sheep Hill fragments, Plumpton Plain whetstones, Yattendon axe and Colchester peg), and those of assessing

without recourse to chemical analysis whether different corrosion products are the result of the use of both bronze and iron in the one object or simply of different types of copper alloy¹ (Laşzló, 1977, 58-9, footnote, 31; e.g. the Mold petrel and Breiddin rivets). With regard to the latter difficulty, and in the light of the history of the bronze Thorndon knife from the Breiddin, variously reported as having contained copper, bronze and iron rivets, close scrutiny, preferably by metallographic analysis, of all instances of "iron" supposedly used in the manufacture of bronze artefacts of the transition period is strongly urged.

Nevertheless, despite these constraints and the consequent omission of much doubtful material, a considerable amount of evidence can still be ascribed with confidence to the Later Bronze Age, and this is set out below in Tables 7 and 8. No attempt has been made in either of these diagrams to arrange the material in anything other than the broadest chronological sequence, namely three overlapping blocks: Group 1 comprises the evidence which, it has been argued above, dates to the ninth - eighth centuries B.C., Group 2, that dating to the eighth - seventh centuries and Group 3 that of purely seventh century B.C. date, the sites at the intersections of the brackets and the two marked with asterisks being those which may date back to the upper limit of the previous group or as late as the sixth century, respectively. Finer precision is currently impossible as demonstrated in Section II and should not be attempted until further dating material is available; this

¹Petrescu-Dîmboviţa has made the following suggestion in this regard;

"Il semblerait que les traces à aspect de rouille que l'on voit sur certains objets de l'âge du bronze et le début de Hallstatt ne seraient pas dues à leur contact avec les objets en fer comme on le croyait mais à les oxydes de fer provenant de cuivre utilisé".

(1958, 67)

TABLE 7:





		Ring	Bead	Pin	Strip	Rod	Nail	Chisel	Knife	Miscellaneous (decorative)	Miscellaneous (functional)	Slag	Ore	Furnace/hearth	Sickle	Spearhead	Sword	Axe	Checkpiece
(8) DEAN MOOR																			
(21) MILL HILL																			
(22) MILNER'S GRAVEL PIT																			
(24) GRIMTHORPE																			
(23) CASTLE HILL																			
(26) BALMASHANNER																			
(27) CULLYKHAN																			
(17) GREAT OAKLEY																			
(16) CORBY																			
(18) WELDON																			
(1) BUDBURY																			
(2) LIDBURY																			
(4) OLIVER'S CAMP																			
(5) BINDON HILL																			
(6) CHALBURY																			
(7) WINKLEBURY CAMP																			
(9) DAINTON																			
(10) NORTON FITZWARREN																			
(13) SALMONSBURY																			
(14) SHENBERROW																			
(12) CRICKLEY HILL C ¹⁴																			
(19) HARTING BEACON*																			
(20) BROOKLANDS*																			
(25) STAPLE HOWE																			
(15) LLYN FAWR																			
(3) MELKSHAM																			
(11) KINGS WESTON																			

Key: ✓ = 1
x = >1

() numbers refer to Map 16.

TABLE 8:[illegible]

Key :

1	
2	
3	
4	

amount of iron
(artefacts/fragments)

1. 1
2. 2
3. 3-10
4. > 10

is especially important in the case of the eighth - seventh century grouping, material from which must be viewed as occurring simply within this two century span, thus avoiding the spurious bunching of material in the seventh century created in the past, which in turn has given rise to the type of theory discussed below in which iron is seen as "suddenly flooding the market" and the bronze industries consequently going into recession. Furthermore, such an exercise highlights the unhelpfulness of using radiocarbon dates in the study of this period, for even when blocking in the chronological canvas as sweepingly as here, the calibrated range of the site marked "C14" is wider than the date-brackets set up on typological grounds, being of three centuries duration and thus falling anywhere within - and even below the lower limit of - this diagram.

Clearly such evidence requires appraisal and it is to this end that this section is devoted. Two points in particular emerge from an examination of Tables 7 and 8 and while these may appear self-evident, it is imperative that they be defined and examined in some detail before considering the hypothesis set forth in the concluding section. The two points are as follows, namely that *iron was manufactured and used at a constant level throughout the ninth - seventh centuries B.C.* and that *such activity occurred in areas close to sources of iron ore.*

With regard to the first point, it would appear from Table 7 that iron was not merely in use from the ninth century B.C. for both functional and decorative purposes, but that there was a distinction in this usage, large tools and weapons being a Hallstatt C phenomenon, sites prior to that date or of purely indigenous cultural affinities yielding small items. Acceptance of the evidence at face value, however, gives rise to the following unsubstantiated assumptions: that iron was a

precious metal during the Later Bronze Age, that its use was negligible in comparison to that of bronze and, most dangerously, that there was a change in both the amount and mode of production in the seventh century, a deduction which inevitably invites theories of external influence and hysteresis. It is my contention that such conclusions are spurious on account of their failure to allow for the biases of survival and discovery, and that when the archaeological record is viewed through the prism of these distortions, a very different picture becomes apparent. When it is realised that a second distinction other than that of size can be drawn between the material contained in Groups 1 and 2 and that in 3, namely that of context - the evidence from the former groups stemming with but one exception from settlement sites, that from the latter deriving from hoards and a burial - the impossibility of sustaining the argument that tools and weapons were not manufactured prior to the seventh century B.C. on these grounds becomes clear, as the following will demonstrate.

Consider first the range of bronze artefacts dating to this period which would be available for study were our evidence to derive merely from settlements - rings, pins, ornamental attachments, toilet implements, small tools, a few socketed axes and metallurgical debris such as casting jets and runners, that material so prevalent on domestic sites of the Ewart Park phase as to have been dubbed "the small bronze phenomenon" (Needham, 1980a, 24-6). Larger items would in the main be lacking (though hinted at by mould debris, e.g. Rathgall, Dainton and Jarlshof), suggestive of the existence of an efficient recycling system, evidence of this larger component coming rather from closed associations, deposits such as hoards¹ and burials. Consider next the fact that

¹Such contexts account for the exceptional occurrence of larger items on settlement sites of this period, e.g. Petters Sports Field, Surrey and Danebury, Hants.

there are no extant ironwork hoards dating to the equivalent period - and to sidetrack for a moment let us examine some possible reasons for such a dearth. Firstly, if iron objects had been deposited together in the same way as bronze artefacts, would we expect to find them as readily? It is well known that iron corrodes more rapidly than bronze, is of a more unprepossessing nature when in such a state and is less easily identifiable as being of prehistoric date due to typological conservatism of form over the centuries. Thus deposits in the plough-soil or in watery locations would neither survive, nor be discovered as readily, as bronze - and in this respect it is surely significant that three of the four instances of the occurrence of iron from non-settlement deposits cited in the catalogue, Balmashanner, Llyn Fawr and Melksham, occur with other artefacts distinctive by their material or size. Secondly, however, while the practice of depositing iron for votive purposes may have occurred, the formation of so called "Founders'" and "Traders'" hoards is unlikely owing to the mechanism of the metal's re-use. In the case of the recycling of bronze it is essential to add fresh ingot metal to the melt in order to conserve the properties of the resultant alloy, and usual to reprocess several artefacts at once; thus in areas lacking the necessary constituents of the melt or which act as industrial centres or entrepôts, it would be natural to find collections of scrap bronze awaiting re-use. In the case of the re-use of iron, however, such preliminaries are unnecessary, the individual item simply being reforged locally when required; indeed, ethnographic observations suggest that this would be done on a customer-smith (and thus archaeologically unrecognisable) basis, eschewing intricate networks of collection and redistribution. Moreover, regardless of the availability of iron, the stockpiling of fast-corroding and easily reusable material

by a smith would seem impractical and thus, given that this is the realm of craftsmanship, inherently unlikely¹.

It may well be the case that the rôle of iron altered in the seventh century B.C., a change perhaps occurring in the availability of the metal to certain sections of the community or in the taboos governing its handling and use - but indulgence in such unverifiable speculations should be avoided. It cannot be deduced from the evidence detailed above, however, that there was an increase in the amount of metal produced in the seventh century B.C. nor that such conspicuous consumption in that century indicates that iron was previously regarded as a high-status metal. It is my contention that the attitude which is slowly becoming prevalent in the realm of bronze metalwork studies exemplified by the following statement from Needham's report on the Dainton mould assemblage - namely that of taking into account the partial nature of the archaeological record - should be applied equally to the study of the ironwork of this period:

"Little is understood as yet regarding the proportion of metalwork in circulation during the Bronze Age which is represented by recovered material, especially if likely different economic strategies regarding recycling and deposition, and different regional recovery potentials, are taken into account".

(Needham, 1980b, 211)

It would, of course, be methodologically unsound to posit the existence of an extensive iron industry in the ninth - seventh centuries in the absence of artefacts other than those listed above, but, happily, arguments *ex silentio* are not required, confirmatory evidence of the latter scale of output being forthcoming in another guise, that of smelting and smithing debris. Table 7 not merely lists eight sites which

¹Dr Brown's observations in Kenya led her to conclude that smiths practised reforging in order to avoid the "exhausting and time-consuming" tasks of ore-collection and smelting.

yield slag or ore debris, but also three which contain evidence of furnaces or ironworking hearths, the excavators' descriptions of these being quoted below.

GREAT OAKLEY, Northamptonshire

'All that remained of the furnace was an oval, bowl-shaped, depression, as found 800 x 550 mm in diameter, and 100 mm deep, with the surrounding natural clay considerably reddened by heat. A few fragments of slag were found in the furnace bowl, some of which were adhering to fired clay.'

(Jackson *et al.*, 1982, 9)

CULLYKHAN, Banff

'Attached to the house is an industrial area having bowls containing wood-charcoal and tap-slag, with the surrounding occupation level producing quantities of industrial bronze and iron waste.'

(Greig, 1972, 229-30)

CRICKLEY HILL, Gloucestershire

'[It is strongly suspected that] the Period 3 Hut number 4 was used for metalworking, with some fragments of iron and very heavy burning (c 1300°C) near the hearth.'

(Dixon, in litt., 1981)

Clearly, the detection of such negligible traces requires careful, observant excavation, and it is thus not surprising to note that these three examples derive from campaigns conducted in the 1970's. Their significance is heightened, however, when the constraints upon finding any such traces are realised, a topic worthy of some consideration.

The first factor to militate against the discovery of foundry and "primary smithing" sites is that of the bias towards excavating settlement sites, and especially hillforts, for ethnographic observations

suggest that the activities of smelting and consolidating the bloom take place outwith the settlement, whether it be for ease of access to the necessary raw materials, ore, clay, charcoal and water (the first two being difficult to transport), to preserve the secrecy of the craft and protect non-smiths, crops and livestock from pollution through contact, or purely to distance the hazardous operation from dwellings. While the latter motives defy proof, the first, being more tangible, can be and has been observed; Jackson has pointed to the coincident positioning of ironworking sites close to ironstone outcrops at Wakerley, Draughton, Weekley and Bulwick, Northamptonshire, the location of the latter, moreover, seemingly being determined by its proximity to supplies of ore, clay and charcoal (Jackson, 1976, 72; Jackson and Ambrose, 1978, 171). Were fieldwork to be focussed upon areas containing such resources, however, it is unlikely that traces of smelting sites would be found, these having been eradicated by subsequent activity, either Roman or Medieval (so sited for the self-same reasons), or if found, that their date be distinguished from that of the latter (*pace* Tebbutt, 1981, 57).

Moreover, it is clear from Brown's helpful observations of recent Kenyan blacksmithing practice that foundry sites leave only ephemeral traces - as the following comment indicates:

"After eighteen months nothing remained of one busy smithy which had been in continuous use for 5 years".

(Brown, 1980, 246)

In the first place, it should be noted that all blacksmithing techniques can be effected by tools of organic materials which clearly would not survive - indeed, many tasks are best served by such materials,

hammers and anvils of stone helping to conserve heat during forging, greenwood tongs being valued for their non-conductive properties - while metal tools, being zealously treasured and handed down through generations of craftsmen (Saunders, 1977, 17) would likewise not occur readily in the archaeological record. Other foundry material, moreover, would be scrupulously recycled, tuyères being ground down to supply grit for replacement nozzles, and slag being reused as a source of fuel and ore for future smelts (Cline, 1937, 32). Clearly, without such items, the remanent pattern of features - hearths, anvil stances and burnt pits - would be indistinguishable from that of a house, save perhaps for traces of intense heat.

It is likely that the task of "secondary smithing" (or "forging") on the other hand, was carried out within settlements, the waste gas being less noxious than that emanating from the smelt, the activity less restricted by taboos, but its products are even harder to detect than those of the foregoing tasks. Traces of burning are less evident (the required heat being merely in the region of 450 - 800°C and thus turning soil grey rather than red), while the products, principally ash, are more ephemeral, the composition of the small amount of remnant slag (viz. a low silica/high iron oxide content) making the latter highly susceptible to weathering.

Thus when the difficulties of finding such sites are taken into consideration and balanced against the number of bronze-working sites known from this period, the amount of extant evidence is clearly significant, testifying to an output far beyond that suggested by the recovered artefacts. The estimation of that output from the amount of slag which has escaped reuse in Roman or Medieval smelts or road-construction is, alas, impossible (Spratling in Hanworth and Tomalin,

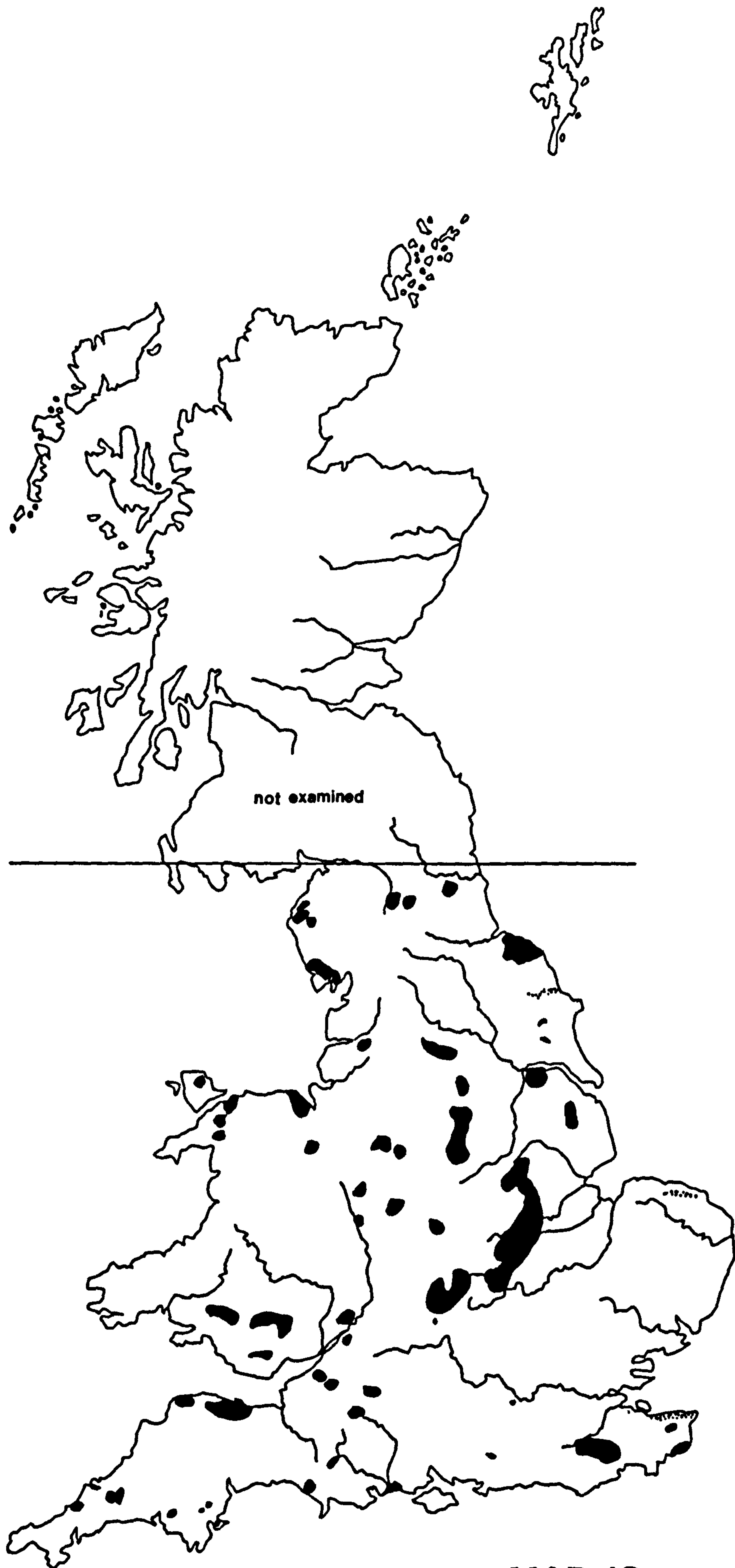
1977, 17), though site-specific attempts, such as Cleere's for the Brooklands and Bardown settlements (Cleere in Hanworth and Tomalin, 1977, 22; Cleere, 1976) have been made. Even these, though, are unsatisfactory, for while it may be computed that a small bowl furnace such as that at Great Oakley would have produced 5-10 kg of metal per smelt, the number of unknown factors governing its use and reuse is too great to permit reasonable estimation of the total output. Such uncertainties do not, however, detract from the main proposition, namely that the data listed in Table 7 point to the existence of widespread indigenous manufacture and use of iron artefacts prior to Hallstatt C, evidence of which survives merely as a range of domestic artefacts on settlement sites similar in type (and frequently in number) to the bronze artefacts recovered from the same contexts.

As for the second point to emerge from Tables 7 and 8, namely that the evidence of the use and manufacture of iron occurs in areas close to sources of iron ore, this can be made more briefly than the first by reference to Map 16. The area north of the Tyne has been omitted in this consideration, the dearth of sites therefrom being indicative of those chronological shortcomings outlined in the text rather than a reflection of prehistoric settlement patterns; in an exercise of the kind attempted in Map 16 it is clearly essential that such distortions be avoided as far as possible.

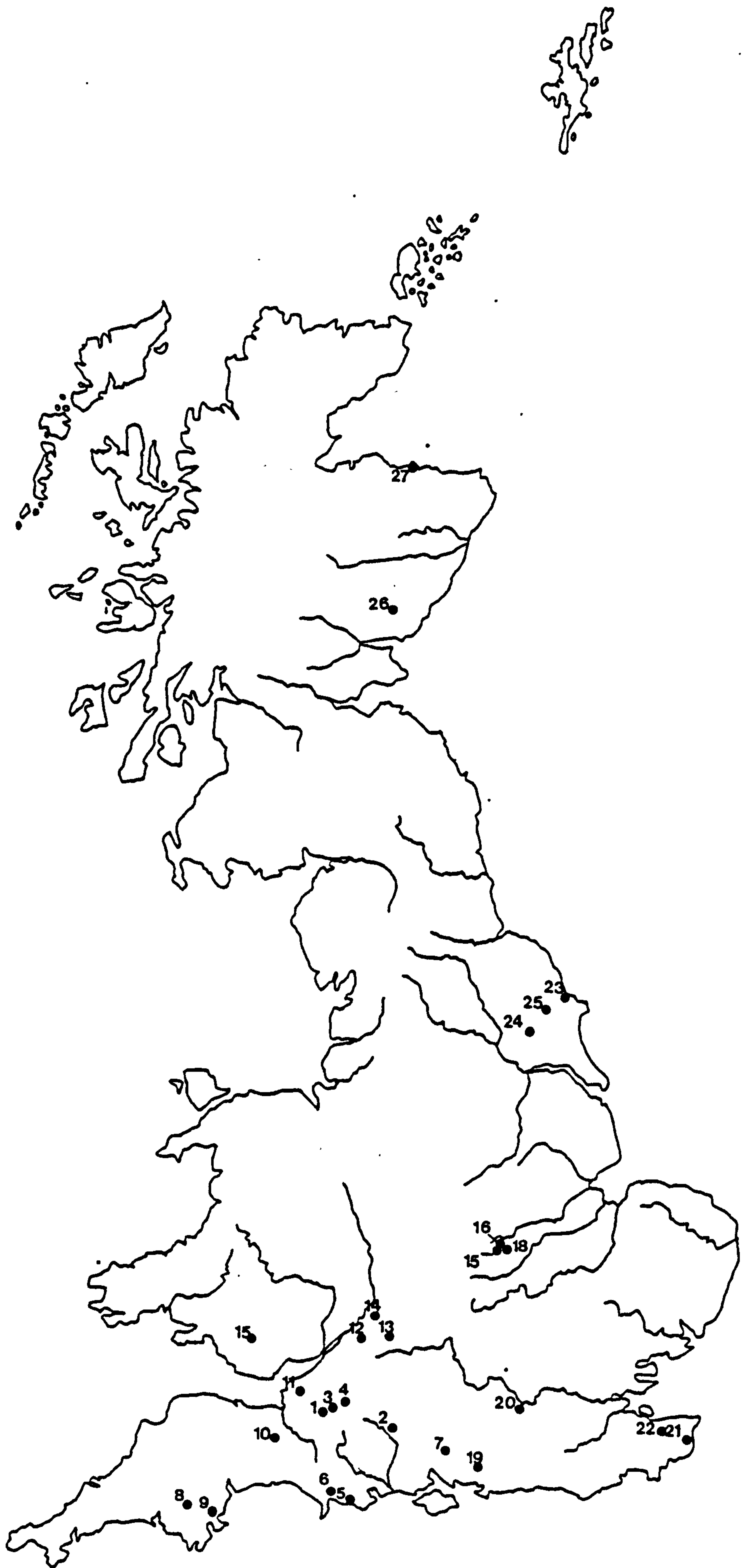
It might be argued that the ubiquity of iron ores in Great Britain detracts from the force of the above observation, proponents of such a viewpoint doubtless maintaining that any site in Britain could be shown to be close to some source of ore, and quoting in support of their position the following observation by Tylecote:

CONTAINS CLEAR OVERLAYS

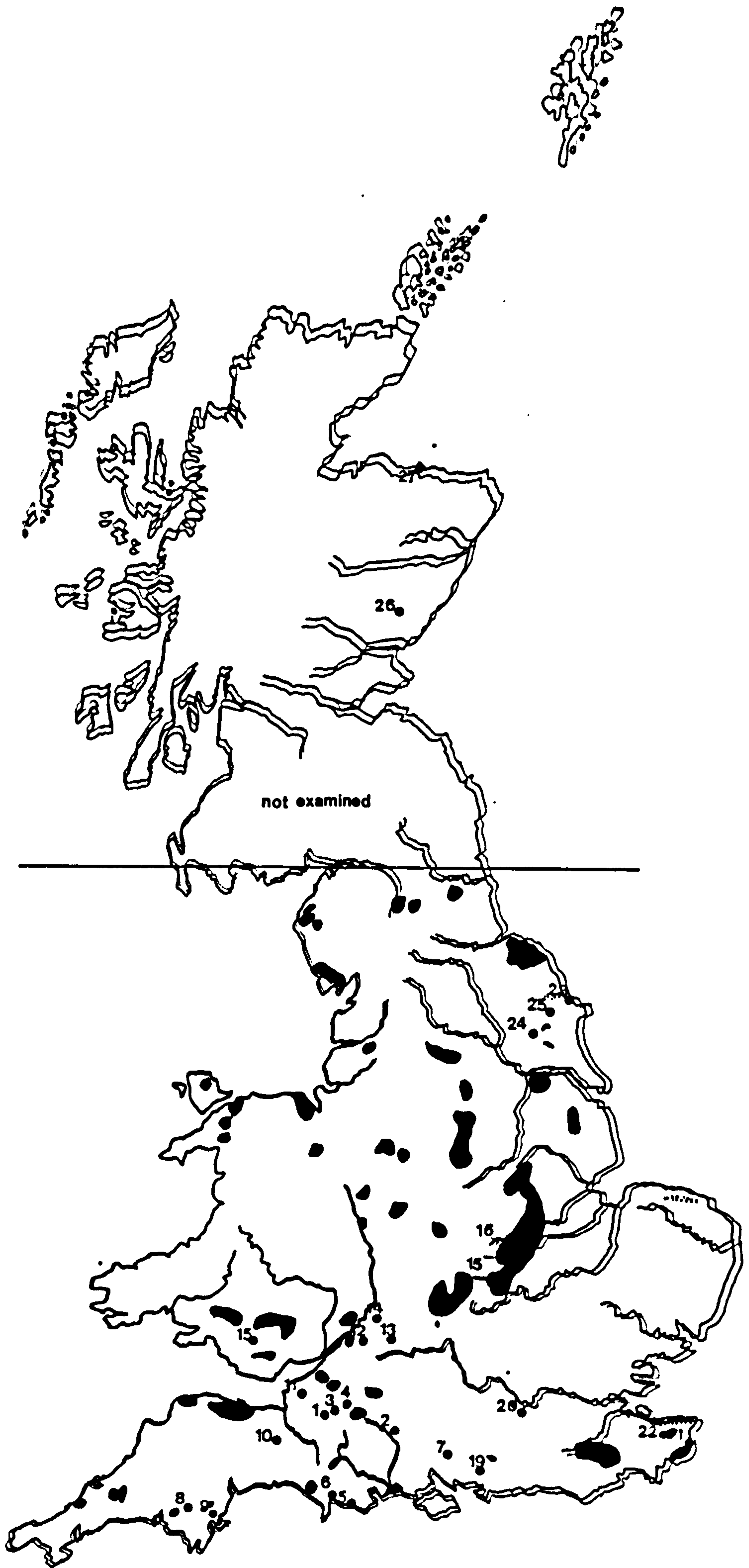
**OVERLAYS SCANNED SEPERATELY AND
OVER THE RELEVANT PAGE.**



MAP 16 (ORES)



MAP 16



MAP 16 (ORES)

MAP 16

- 1 Budbury, Wiltshire
- 2 Lidbury, Wiltshire
- 3 Melksham, Wiltshire
- 4 Oliver's Camp, Wiltshire
- 5 Bindon Hill, Dorset
- 6 Chalbury, Dorset
- 7 Winklebury, Hampshire
- 8 Dean Moor, Devon
- 9 Dainton, Devon
- 10 Norton Fitzwarren, Somerset
- 11 Kings Weston Hill, Somerset
- 12 Crickley Hill, Gloucestershire
- 13 Salmonsbury, Gloucestershire
- 14 Shenberrow Camp, Gloucestershire
- 15 Llyn Fawr, Glamorgan
- 16 Corby, Northamptonshire
- 17 Great Oakley, Northamptonshire
- 18 Weldon, Northamptonshire
- 19 Harting Beacon, Sussex
- 20 Brooklands, Surrey
- 21 Mill Hill, Kent
- 22 Milner's Gravel Pit, Kent
- 23 Castle Hill, Yorkshire
- 24 Grimthorpe, Yorkshire
- 25 Staple Howe, Yorkshire
- 26 Balmashanner, Angus
- 27 Castle Point, Banff

"The only English counties that have not yielded ore are: London, Suffolk, Cambridge, Essex, Hertfordshire, Berkshire, Bedfordshire, Middlesex and Buckinghamshire. The fact that no sources of ore are known in these counties at the present time is no proof that there are none or have been none. It is possible that small deposits which might have been of interest to early people in these counties have gone unnoticed".

(Tylecote, 1962, 175)

The corollary to this surely is that if the correlation between ore sources and artefacts is deemed meaningless and any site thus has an equal chance of containing iron objects, then the pattern which would emerge from an examination of the artefactual material from all sites of Later Bronze Age date would be one in which the greatest concentrations of iron objects occurred in those areas of greatest site density or most intensive fieldwork. This is not the picture which emerges from such a study¹, the concentrations of iron-producing sites being rather in the Cotswolds-North Somerset area, the South-Western Peninsula, Northamptonshire and Eastern Kent, areas not of renown in these two respects, but noted for their iron ore content - and it is thus my contention that the coincidence is significant². The implications of this observation, and that of the first point to emerge from study of Tables 7 and 8, will be considered in the concluding section.

¹The index compiled from the original journal search contains that information, thus providing the necessary control group.

²Such an opinion receives confirmation in the fact that the four areas considered in every discussion of the iron ore resources of Great Britain to be devoid of ores - the Fens, the Upper Thames Basin, Middle Thames and Thames Estuary - while containing much later prehistoric evidence, lack instances of the manufacture and use of iron in this period. Only one extensive ore source is known in these areas, that of St George's Hill, Weybridge, Surrey - the very location of one of the early iron-producing sites in Table 7, that of Brooklands.

PART II: Conclusions

"The solution of the problem of technological change, as one facet of the larger problem of cultural change, calls for the disclosure of all common events in the process. The availability of a newly invented tool does not guarantee its immediate and widespread acceptance." ¹

So wrote Margaret Hogden in a fascinating study of the distributions of technological innovations in England through history, a study in which she emphasised the "social process" involved in the adoption of inventions - the need on the one hand for enterprising individuals to administer the "dynamic push" necessary to alter the configuration of the technological process, and on the other for cultural acceptance on the part of the recipient society. Her words have a modern ring to them for they call to mind a more recent article, that by Professor Renfrew entitled, "The Anatomy of Innovation". The historian's privilege of painting a detailed picture of the actions of named individuals has been replaced in the latter by the prehistorian's clumsier modelling, but apart from this change in perspective, the two accounts differ little, as the quotation cited below indicates, Renfrew likewise focussing attention upon the mechanisms governing choice in the innovative process.

"It is argued that what generally governs the innovation in society, the widespread adoption, is not simply the availability of information on the new process but the existence of conditions making its acceptance beneficial and seen to be beneficial. Availability of the technical means is a necessary but not a sufficient condition for the adoption of new inventions or discoveries."

(Renfrew, 1978, 89, 94)

¹Margaret Hodgen, *Change and History*, 1952, 44, 200-1.

Two points emerge from the work of these authors which are worth considering in the light of the evidence detailed above, the first being their respective observations that knowledge of technological skills can be available in society for centuries before circumstances conspire to promote their widespread adoption. The state of iron technology in the British Later Bronze Age can best be described, I contend, in such terms of semi-dormancy, the build-up to the inception of the "Iron Age" (in the narrow definition of Snodgrass and Waldbaum quoted above, page 38) having occurred in three stages.

The initial experiments with iron metallurgy and the use of iron artefacts may well have taken place in the later second millennium B.C., in Britain as on the Continent, whether inspired by smiths from the latter area (the Penard period being one of intense cross-Channel contact and technological fertilisation) or occurring empirically at the hands of indigenous bronzesmiths - but since traces of the earliest stage in any process are notoriously difficult to detect archaeologically, as study of British Neolithic farming practice has shown, it is thus not surprising that but one piece of evidence dating to this period has been recovered, that from Dean Moor, Devon. Not only would the technological competence required in the prospection, mining and smelting of iron have been available at this early date but also that required in the process of forging, a topic which requires some consideration. It has already been observed that the techniques of working blooms into artefacts are implicit in those of forming beaten bronze artefacts (see above, page 40), but it should also be noted that the manufacture of sheet bronze differs radically from that of cast bronze, requiring not merely new tools and techniques but also, as Sandars has recently pointed out (Sandars, 1983, 60), new attitudes in the minds of craftsmen,

reconciling them to this "simpler and more brutal type of work". It is clear that such a change occurred in Britain during the Penard industrial phase, that watershed in later British prehistory (Burgess, 1980, 265) which saw the introduction of new products, a new alloy and the advent of beaten bronze - and it is thus conceivable that the first experiments with iron occurred in this milieu of technological inventiveness.

The second phase is that upon which the present study has concentrated, the "transition period" of the ninth to seventh centuries, such periods being, in Scott's words, "the times taken for the new technologies to assume overall the utilitarian functions of their predecessors" (viz. active, working artefacts, particularly cutting and percussive tools; Scott, 1979, 189). Several authors have attempted to define the characteristics of these phases, the most detailed consideration being that of Przeworski (1939) who listed the following seven features:

1. Imitation of Late Bronze Age types in iron.
2. Simultaneous appearance of bronze and iron objects of the same use and type.
3. Inlay of bronze objects with iron.
4. Combination of iron working and bronze ornamental parts in the same implement.
5. Fitting of bronze products with iron parts.
6. Use of bronze rivets on iron implements.
7. Repair of bronze objects with iron parts.

(quoted in Snodgrass, 1971, 229)

Features 1 and 2 have indeed been observed in the British Later Bronze Age and it has been envisaged that Feature 5 may likewise be seen to obtain once metallurgical tests have been carried out on those bronze

spearheads from the Thames thought to contain iron pegs (viz. Appendix III and page 264), but evidence for the remaining four aspects is lacking, though observed in contemporary transition assemblages in Central, Southern and Western Europe (Székely, 1966; Laszló, 1977; Wells, 1981, 102; Scott, 1979, 192). Two characteristics not listed by Przeworski may, however, be added from the British evidence, these being the use of iron tools on bronze artefacts and the manufacture of bronze and iron items within the same workshop; the first is only known by inference (Coombs, 1979, 205) and thus may be thought too dubious for inclusion, but the second has been clearly demonstrated at Cullykhan, Banff (see above, page 271 and the description cited in the previous part of this chapter) and may perhaps be detected also at Mill Hill, Deal, Kent.

Despite the epithet "transition period", a level of extreme technical competence was attained during this phase as witnessed, for instance, by the iron sickle from Llyn Fawr, its beautifully ribbed blade perhaps having been formed by swage-hammering, its fullered and flattened socket and grooved iron ring cleverly welded onto the blade and socket-mouth respectively. The very existence of such native skillfulness in the seventh century B.C., moreover, points *a priori* to the existence of a flourishing Later Bronze Age iron industry, an argument which Scott uses with regard to the intricately fashioned swords from the Lisnacrogher crannog, Co. Antrim (Scott, 1974c, 49).

It has been argued above that in view of the quality of the available evidence and the current state of our dating techniques it is impossible, and indeed dangerous, to offer a more precise chronological breakdown of the material from this phase than that suggested above (Table 7); I stress this again, because belief to the contrary leads to false impressions

and spurious hypotheses. Burgess has been the chief proponent of the viewpoint which posits that a rapid increase in the production of iron in the seventh century caused the demise of the native bronze industries, a theory which is best described in his own words:

"It is increasingly evident that iron-working spread very rapidly in the 7th century B.C. It involved a very different technology from the non-ferrous metals hitherto worked, and whether it could have spread so quickly without being carried by experts is debatable.

Continental metalworkers ... may also have been responsible for the rapid dissemination of iron-working. Their activities, and particularly the introduction of iron, must have had a shattering effect on Irish-British bronzeworkers. Here, perhaps, is the reason why there are such vast numbers of Ewart Park, and especially Carp's Tongue, hoards. They must represent wholesale dumping, early in the 7th century, when the bottom fell out of the bronze market. For with the rapid spread of iron-working, and the relegation of bronze to a minor role, a massive flood of surplus bronze will have been released on to the market".

(Burgess, 1980, 274; 1979, 275)

Several features of Burgess' argument invite criticism, not least his cavalier treatment of radiocarbon dates, these being quoted in uncalibrated form and without their quantifiable errors, thus creating the impression of a cluster of iron artefacts dating snugly to the sixth century b.c. and hence, it is assumed, to the seventh century B.C. Secondly, he greatly underestimates the importance of the native bronze industries of the seventh century, thus creating the impression of the replacement of the latter by iron, an impression which vanishes when the state of bronze production in that century is examined more fully.

O'Connor (1980, 230-4) and Thomas (unpublished research, Cambridge University) have pointed to the existence of thriving local centres of axe production in East Anglia, Wiltshire, Dorset and Scotland during this period, while Northover has observed (unpublished paper

delivered to Prehistoric Society Seminar, 1982, 5) that bronzes from South Wales, Hampshire and Devon show an improvement in quality of alloy, size of casting and skill in manufacture. Moreover, there seems to be no disruption in certain networks of cross-Channel bronze supply, Cornwall, Dorset, Hampshire, Kent, North Wiltshire and East Anglia (Dunning, 1959) receiving cargoes of bronze (Turner, 1980) in the form of Armorican axes, evidence for the re-use of these being provided by bronze cake from Mountbatten, Plymouth (Northover, *op. cit.* 5). Indeed, to pursue this point further, it appears that those areas of Southern Britain¹ which contain evidence of the production or the receipt of bronze in the seventh century are those which had either been producing, (Dorset, Hampshire, Kent) or manipulating supplies of, (North Wiltshire, East Anglia²) iron since the ninth century, maintaining, to subvert Braidwood's famous phrase, "a broad spectrum metallurgical economy". The "power" or "prestige" accruing from such activities may be manifest in the archaeological record in two ways, the first being that of altered settlement patterns; while it is dangerous to argue that such patterns depend upon but one facet of the economic system, especially when that facet is merely one of the most tangible and its importance thus inflated out of proportion to its original significance, nevertheless it is suggested that the renewed settlement apparent in Kent in the ninth - eighth centuries and in Wiltshire from the eighth may

¹The area north of the Tyne is once again omitted, for the reasons detailed above (see page 286).

²It is tentatively suggested that the thriving metal industry of the Fenland district (see O'Connor, 1980, Map 76) might be involved in the riverine transportation of the plentiful iron resources on the western edge of that region - though such a suggestion clearly requires further research.

be connected with the former area's ability to produce iron artefacts and the latter's (pace Barrett and Bradley, 1980b, 204) to control the movement of ore supplies. Such power may also manifest itself in the ability of these areas to attract supplies of bronze in the seventh century, to the detriment of those areas which lacked iron and the resultant influence in metallurgical markets, areas such as the Middle and Lower Thames Valley and the Thames Estuary. The vast number of Ewart Park/Carp's Tongue hoards therein, however, chronologically ordered, points to dependance upon supplies from elsewhere, such deposits, I contend, being collections of unusable scrap which could not have been reworked without the addition of fresh ingot metal¹; the negligible amount of bronze produced in the seventh century may therefore testify to an inability to trade in an acceptable substitute commodity, this being an area devoid of iron resources and evidence of that metal's use in the period under discussion. Contrary to Burgess then, the two technologies should be seen as *mutually dependant* rather than *exclusive*.

This, however, is not the place to offer a critique of Burgess' theory in particular, the intention being rather to investigate the way in which the disclosure of the occurrence of a lively iron industry from the ninth century affects hypotheses, such as his, built upon ideas of cause and effect. Negative though this may appear, its value lies in

¹ While certain hoards contain copper ingots (e.g. Wickham Park and Addington, Surrey and Shoebury, Essex), these are few in number; moreover, the very fact that such cakes are of pure copper implies, as Charles wrote (1975, 22), "that the founder also possessed a form of tin addition used to bring the melt up to the desired composition". This supply is likewise not evident in these hoards (though admittedly it is difficult to recognise, as Charles' article indicates) nor that of the other constituents in the alloy, which would have to be added afresh in order to sustain the properties of the resultant recycled metal; it may well be that inability to attain supplies of these minor elements is the crucial factor. Incidentally, it should be noted that few of these South-Eastern Founders' hoards contain jets, sprue-caps or runners, the most useful and easily reworkable sources of high-quality scrap bronze available, testifying, I contend, to the working of an efficient recycling policy in an area in which raw metal was precious.

the demonstration that *the existence of iron technology per se* did not cause the overall demise of the bronze industries - for if that was the case then this could have occurred, if not in the initial phase, then at least in the ninth century; rather more positively too, by detracting from a monocausal and purely technological reason, it stimulates enquiry into the dynamics of the entire Later Bronze Age cultural system, a point considered below.

The final stage of the three phase model for the introduction of iron technology, that which sees iron becoming the predominant metal for edge-tools and bronze being relegated to a minor, decorative, rôle - the "Iron Age" in technological terms - takes place outwith the period under discussion, occurring in Britain only in Hallstatt D¹. In attempting to determine what caused the "jump" from use of one metal to that of the other, it is necessary to examine the entire cultural system - this being the second point of importance to emerge from Hodgen and Renfrew's work, as seen in the quotation by the first author cited at the beginning of this section, and in that by the second quoted below.

"Widespread adoption of a new process ... depends in a complicated way upon individual choice governed by social and other factors. *Internal developments* within the society would have shifted the "advantage" factor, and these changes will have been as much social as technical."

(Renfrew, 1978, 94, 114:
italics mine)

¹The belief that iron became the dominant metal on the Continent with the onset of Hallstatt C is erroneous; computation of the amount of metal deposited in Hallstatt C₁ graves at Mindelheim (Kimmig, 1959) yielded the following figures: 82.5% bronze, 17.5% iron, a similar 4 : 1 ratio being the norm for Hallstatt C deposits in Western Europe.

With regard to Britain, such a discussion involves examining climatic configurations and settlement patterns, population trends, the rôle of bronze and pottery and networks of political alliance and exchange, a type of enquiry which Kristiansen has attempted with regard to the Scandinavian Late Bronze Age - Early Iron Age transition and which Rowlands advocated in his recent influential paper (1980, 46). Such an enquiry must be carried out on a regional basis, for blanket explanations for the whole of Britain, such as that of "climatic deterioration", are too vague to be of any use (recent research in the particular area cited having shown that the change to cooler, wetter, conditions was neither synchronous throughout the British Isles nor its effects uniform [Savory, 1980b; Cunliffe, 1983; Gates, 1983]). In this regard it is interesting to note the following observation by Hodgen:

"The greater the ease afforded by an environment, the weaker the stimulus to advancement. ... Turmoil, conflict and impoverishment commonly make people tolerant of suggestions of new ways of getting a living".

(Hodgen, 1952, 151)

Such disruptive circumstances may have been sufficient to act as the catalyst promoting the widespread acceptance of a form of technology already being practised to good effect in certain areas of the country - but the definition of those factors, being dependant upon detailed regional studies, goes far beyond the scope of this thesis.

Not only is a considerable amount of research required in order to understand the mechanisms at work in this, the third, stage in the adoption of iron, but also those at work in the second, that which forms the subject of this thesis. Some ways of attaining a clearer picture were suggested in the previous section - an improvement in methods of

absolute dating, refinement in our understanding of metalwork traditions and in our awareness of the vestiges of smelting and smithing, and the implementation of programmes of metallurgical analysis - but others still require to be mentioned. Programmes of metallographic studies such as Scott has carried out on early Irish ironwork (Scott, 1971; 1976b; 1977b) would do much to evaluate the competence of the ironsmiths of the Later Bronze Age, thus improving our understanding of the technological cross-fertilisation occurring between the two industries, as well as aiding the construction of artefact typologies (iron objects being inimical to classification by shape), while the implementation of techniques of source determination, whether by means of trace (Piaskowski, 1964; 1965; Haldane, 1969; 1970) or inclusion analysis (Todd and Charles, 1977; 1978), by building up a sufficiently large body of evidence to permit statistical analysis (*pace* Scott, 1971; Kelly, 1976), would allow the provenance of iron objects to be divined and lead ultimately to the recognition of production centres. Programmes of dating metallurgical products radiometrically should also be developed, for though the direct dating of iron artefacts advocated by van der Merwe (1969) is not possible in the case of bloomery iron, the sample generally requiring the entire artefact, the technique can be applied to iron slag, plano-convex furnace bottoms being especially suited to this task (Scott, 1974b; 1976). Little can be done, alas, about estimating the impact of the early iron industries on the later prehistoric landscape - as is possible for the Roman iron industry (*pace* Cleere, 1972) - but site-specific studies aimed at eliciting the maximum amount of information about deforestation, ore consumption, output and manning requirements should be attempted for any settlements excavated in future which contain extensive iron-working *débris*. In the realm of bronze metalwork

studies, an extension of the programmes of research being carried out by Northover and Thomas (Oxford and Cambridge Universities respectively) into the composition of artefacts and hoards of the Ewart Park and Llynfawr industrial traditions is strongly urged, for only thus will the source of the resources which sustained certain local bronze industries and the rôle of that metal at the end of the Bronze Age be understood.

In general terms the foregoing study has attempted to shed some light on that period of later British prehistory to which Wheeler attached the epithet "crepuscular" (1953, 10). More particularly, its aims were two-fold: to provide a catalogue of the occurrence of iron in secure contexts in Later Bronze Age Britain and thence to gain some understanding of the significance of such evidence. It is hoped that the attainment of the first goal will free others from the laborious task of compiling such a corpus, thus allowing them to engage at length in some of the lines of enquiry detailed above, thereby refuting or confirming the suggestions ventured during the pursuit of the second.

**SECONDARY CATALOGUE
AND MAPS**

- | | | |
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WILTSHIRE AND CRANBORNE CHASE

LIST 2: Sites are shown on Map 2

- BATTLESBURY, Warminster 1
W.A.M., xlii, (1924), 368-373; xliii, (1927), 400;
lvi, (1946), 262-4; Hawkes, 1931, 92; D.M.C., (1934),
90-2, fig. 18; V.C.H., (1957), 118, 270.
- (BOSCOMBE CHURCH, Allington 2
V.C.H., (1957), 25.)
- (BOTLEY COPSE, Shalbourne 3
V.C.H., (1957), 105.)
- (BURBAGE DOWN, Burbage 4
V.C.H., (1957), 53.)
- (BURDEROP PARK, Chiseldon 5
V.C.H., (1957), 56.)
- CASTERLEY CAMP, Upavon 6
W.A.M., xxxviii, (1913-4), 53-105; Hawkes, 1931, 92;
D.M.C., (1934), 93-110; V.C.H., (1957).
- (CHERHILL DOWN, Cherhill 7
V.C.H., (1957), 55.)
- CHISELBURY, Fovant 8
W.A.M., xlvii, (1935-7), 20-4; Crawford and Keiller,
1928, 73-7.
- CHISENBURY, Enford 9
W.A.M., xxxviii, (1913-4), 251; xlv, (1931), 264;
xlvi, (1932), 1-3, 88; D.M.C., (1934), 112;
V.C.H., (1957), 69.

- COLLINGBOURNE DUCIS COW DOWN, Collingbourne Ducis 10
W.A.M., x (1866-7), 85-103; Ant. J., xii, (1932), 420-1.
- (COMESDEANE WELL, Enford 11
V.C.H., (1957), 69.)
- (DEAN BOTTOM, Ogbourne St. Andrew 12
V.C.H., (1957), 94.)
- DURRINGTON WALLS, Durrington 13
Wainwright and Longworth, 1971, 317, fig. 102, 2, 3, 4.
- (EASTON CLUMP, Easton 14
V.C.H., (1957), 67.)
- ERLESTOKE DETENTION CENTRE, Erlestoke 15
W.A.M., lix, (1964), 205-6.
- (FAIRMILE CLUMPS, Grafton 16
V.C.H., (1957), 72.)
- FIGSBURY RINGS, Winterbourne Dauntsey 17
W.A.M., xxxvii, (1911-12), 100, 129; xliii, (1925-7), 48-58;
Crawford and Keiller, 1928, 84-6.
- FOUR ACRE COVERT, Compton Bassett 18
V.C.H., (1957), 60.
- FYFIELD DOWN, Fyfield 19
W.A.M., Li, (1945-7), 258-60; V.C.H., (1957), 72.
- GROVELY CASTLE, Steeple Langford 20
V.C.H., (1957), 107.
- (HACKPEN HILL, Avebury 21
V.C.H., (1957), 34.)

- HIGHFIELD, Fisherton, Salisbury 22
W.A.M., xxxviii, (1913-4), 317; xlvi, (1932-4), 579-624;
V.C.H., (1957), 101.
- HIGHWORTH, Highworth 23
W.A.M., lxii, (1967), 135; lxiii, (1968), 118.
- (HUIISH HILL, Huish 24
V.C.H., (1957), 78.)
- IDMISTON, Salisbury 25
W.A.M., lxvi, (1971), 190.
- KNAP HILL, Alton 26
D.M.C. forthcoming
- LIDDINGTON, Liddington 27
W.A.M., xxxv, (1907-8), 389-407; xxxviii, (1913-4), 577-84;
V.C.H., (1957), 82.
- LONGBRIDGE DEVERILL COW DOWN, Warminster 28
W.A.M., xxxviii, (1913-4), 281; lvii (1958-60), 9-10;
lviii, (1963), 31-2; P.P.S., xxvii, (1961), 346-7;
Hawkes, 1961, 18-20.
- (LOWER YIELDING, Mildenhall 29
V.C.H., (1957), 87.)
- MANCOMBE DOWN, Warminster 30
W.A.M., lx, (1965), 52-6.
- MARLBOROUGH COLLEGE, Marlborough 31
Rept. Marl. Coll. Nat. Hist. Soc., 46, (1897), 79-80.
W.A.M., xxx, (1898-9), 67; xxxviii, (1913-4), 285.
- MARTINSELL, Pewsey/Wilcot 32
Meyrick and Hawkes: Priv.; D.M.
W.A.M., li, (1947), 256-7; V.C.H., (1957), 121, 270.

- MOTHER ANTHONY'S WELL, Bromham 33
W.A.M., lxxii/lxxiii, (1977-8), 204.
- OLDBURY, Calne 34
W.A.M., v, (1858-9), 128; xxiii, (1886-7), 213-22;
xxvii, (1893-4), 291-3; xxviii, (1894-6), 277;
Ant. J., xii, (1932), 427; Hawkes, 1931, 92;
V.C.H., (1957), 53.
- PEWSEY 35
West Wick Farm, Pewsey
7.1969; 78.1973.

Black Patch Cemetery, Pewsey
W.A.M., lxvii, (1972), 172; lxviii, (1973), 130.
51.1971; 4.1969.

(Denny Sutton Hipend, Pewsey
43/1979.)
- POTTERNE 36
Blackberry Lane Cemetery, Potterne
W.A.M., xlvi, (1932-4), 599; lxvii, (1972), 172;
V.C.H., (1957), 96.
- (PRESHUTE DOWN, Preshute 37
V.C.H., (1957), 97.)
- (ROCKLEY DOWN, Ogbourne St Andrew 38
V.C.H., (1957), 94.)
- (ROUND HILL DOWN, Ogbourne St George 39
V.C.H., (1957), 95.)
- SOUTHMILL HILL, Amesbury 40
V.C.H., (1957), 29.
- SOUTH WEST UPAVON AERODROME, Enford 41
W.A.M., li, (1945-7), 241; V.C.H., (1957), 69, 122.

- (STANTON ST BERNARD DOWN, East Kennet
Milk Hill
V.C.H., (1957), 106.) 42
- Harestone Down
W.A.M., li, (1946), 259; V.C.H., (1957), 67.
- STOCKTON EARTHWORKS, Stockton 43
W.A.M., xliii, (1925-7), 389-94; D.M.C., (1934), 174;
V.C.H., (1957), 174.
- STONEHENGE, Amesbury 44
V.C.H., (1957), 29.
- SWINDON 45
V.C.H., (1957), 112.
- (TOR MEAD, Great Bedwyn 46
V.C.H., (1957), 73.
- UPTON COWDOWN, Westbury 47
D.M.C. forthcoming.
- WESTBURY IRONWORKS, Heywood 48
W.A.M., xxxvi, (1909-10), 464-77; D.M.C., (1934), 69-86.
- WEDHAMPTON, Urchfont 49
W.A.M., xlvi, 599; V.C.H., (1957), 116.
- WILSFORD HILL, Pewsey 50
W.A.M., xlv, (1930-2), 214; D.M.C., (1934), 155, 158;
V.C.H., (1957), 122, 259.
- (WILTON DOWN, Grafton 51
V.C.H., (1957), 72.)

WINKLEBURY, Berwick St John 52

Pitt-Rivers, 1888, 233-53; Crawford and Keiller, 1928, 49, 53;
Hawkes, 1931, 92; Ant. J., xii, (1932), 428; Hawkes, 1947, 30;
V.C.H., (1957), 39.

WINTERBOURNE DAUNTSEY, Winterbourne 53

Stone, 1932, 445-53; V.C.H., (1957), 124.

WUDUBURH, Broad Chalke 54

Crawford and Keiller, 1928, 131-7; V.C.H., (1957), 50.

DORSET AND HAMPSHIRE

LIST 3: Sites are shown on Map 3.

- | | |
|---|----|
| ABBOTSBURY CASTLE, Abbotsbury, Dorset
P.D.N.H.A.S., 96, (1975), 56. | 1 |
| ACTON, Dorset
P.D.H.N.A.S., 70, (1948), 43. | 2 |
| BARTON FIELD, TARRANT HINTON, Dorset
P.D.N.H.A.S., 96, (1974), 64-6. | 3 |
| BOWDEN'S HILL, Melcombe Horsey, Dorset
P.D.N.H.A.S., 79, (1957), 115. | 4 |
| CHESELBOURNE, Dorset
Barrett, J. and Bradley, R., eds., 1980a, 200. | 5 |
| CHURCH KNOWLE, Dorset
P.D.N.H.A.S., 77, (1955), 126-7. | 6 |
| COMBS DITCH, Dorset
P.D.N.H.A.S., 86, (1964), 112. | 7 |
| COWDERY'S DOWN, Basingstoke, Hampshire
Millett, 1980a and b, 1981. | 8 |
| DANEBURY, Hampshire
Cunliffe, 1971b; Cunliffe and O'Connor, 1979. | 9 |
| EGGARDON CAMP, Askerwell, Dorset
P.D.N.H.A.S., 76, (1954), 89. | 10 |
| ELDON'S SEAT, Encombe, Dorset
Frend, 1949, 52; Farrar, 1961, 83-4;
P.D.N.H.A.S., 85, (1963), 98-9; 86, (1964), 109;
Cunliffe and Phillipson, 1968. | 11 |

- EVERLEY WATER MEADOW, Dorset 12
Unpublished.
- GALLOWS GORE, Worth Matravers, Dorset 13
Calkin and Piggott, 1938; Calkin, 1948, 40-2.
- GUSSAGE COW DOWN, Dorset 14
P.D.N.H.A.S., 73, (1951), 115.
- HAMBLEDON HILL, Dorset 15
Crawford and Keiller, 1928, 54;
P.D.N.H.A.S., 81, (1959), 108-9.
- HENGISTBURY HEAD, Hampshire 16
Bushe-Fox, 1915; Cunliffe, 1978b.
- HERSTON, Dorset 17
Calkin, 1948, 42.
- HILLBROWN, Pokesdown, Hampshire 18
Avery, 1981, 61.
- HOG CLIFF HILL, Maiden Newton, Dorset 19
P.P.S., 26, (1960), 345; 27, (1961), 347;
Rahtz, 1959, 94; 1960, 83.
- KIMMERIDGE, Dorset 20
Calkin, 1948, 37-40.
- KNOWLE HILL, Dorset 21
P.D.N.H.A.S., 79, (1957), 106-7.
- LANGTON MATRAVERS, Dorset 22
Calkin and Piggott, 1938, 66-72.
- NEWFOUNDLAND WOOD, Church Knowle, Dorset 23
P.D.N.H.A.S., 89, (1967), 141-3; 91, (1969), 178-80.

- OLD DOWN FARM, Andover, Hampshire 24
Davies, 1981.
- OWSLEBURY, Hampshire 25
Ant. J., 48, (pt. 1: 1968), 18-31; 50, (pt. 2: 1970),
246-61.
- PINS KNOLL, Litton Cheney, Dorset 26
P.D.N.H.A.S., 81, (1959), 124-6; 85, (1963), 95-6.
- PORTSDOWN HILL, Hampshire 27
Bradley, 1967.
- POUNDBURY, Dorset 28
Ant. J., 20, (1940), 429-44.
- QUARRY LODDEN, Bincombe, Dorset 29
Bailey and Flatters, 1971.
- ROCKBOURNE DOWN, Hampshire 30
P.H.F.C.A.S., 15, (pt. 1: 1940), 53-5.
- ROPE LAKE HOLE, Kimmeridge, Dorset 31
P.D.N.H.A.S., 85, (1963), 102; Maw, 1975.
- RUCTSTALLS HILL, Basingstoke, Hampshire 32
Oliver and Applin, 1979.
- SHEARPLACE HILL, Sydling St Nicholas, Dorset 33
P.D.N.H.A.S., 80, (1958), 100-1;
Rahtz and ApSimon, 1962.
- SHEEPSLEIGHTS, Worth Matravers, Dorset 34
Calkin, 1948, 30-2.
- SHIPTON HILL, Shipton Gorge, Dorset 35
P.D.N.H.A.S., 77, (1955), 135-6.

- SOUTHILL, Radipole Lane, Weymouth, Dorset 36
P.D.N.H.A.S., 96, (1974), 54-5.
- SOUTH TARRANT HINTON DOWN, Dorset 37
P.D.N.H.A.S., 82, (1960), 84.
- SWEET HILL LANE, Portland, Dorset 38
P.D.N.H.A.S., 85, (1963), 101; 92, (1970), 141.
- TWYFORD DOWN, Hampshire 39
Avery, 1981, 63.
- WINCHESTER, Hampshire 40
Hawkes, 1976b, 68-9.
- WOODTOWN FARM, West Parley, Dorset 41
Drew, 1929.

SOUTH WESTERN PENINSULA

LIST 4: Sites are shown on Map 4.

- | | |
|---|----|
| BODRIFTY, Cornwall | 1 |
| Dudley, 1956; Johnson, 1980, 155, 169. | |
| CANNINGTON HILL, Exmoor | 2 |
| Grinsell, 1970, 70. | |
| CARWYNNEN, Camborne, Cornwall | 3 |
| P.W.C.F.C., I., pt. 2, (1953-4), 48-53. | |
| CASTLE DORE, Cornwall | 4 |
| Miles <i>et al.</i> , 1977. | |
| GARROW TOR, Bodmin | 5 |
| Silvester, 1979, 177, 179; Johnson, 1980, 149, 155. | |
| HAM HILL, Somerset | 6 |
| S.A.N.H.S., lxxix, (1923), 49-53; lxx, (1924), 104-116;
lxxi, (1925), 57-75; Miles <i>et al.</i> , 1977. | |
| KESTOR, Devon | 7 |
| Fox, 1954b. | |
| MAEN CASTLE, Senner, Cornwall | 8 |
| P.W.C.F.C., 1, pt. 3, (1955), 98-115. | |
| METHERALL, Devon | 9 |
| Silvester, 1979, 177, 179. | |
| NOR' NOUR, Isles of Scilly | 10 |
| C.A., 3, (1964), 87; 4, (1965), 65-6. | |
| SPERRIS CROFT, Cornwall | 11 |
| Johnson, 1980, 155, 169. | |

TAUNTON HIGH STREET, Somerset
S.A.N.H.S., 12, (1975-6), 70.

12

TRENTISHOE DOWN, Exmoor
Grinsell, 1970, 70.

13

WICCA, Cornwall
Johnson, 1980, 155, 169.

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NORTH SOMERSET AND THE COTSWOLDS

LIST 5: Sites are shown on Map 5.

- | | |
|--|----|
| BATHAMPTON DOWN, Gloucestershire
Wainwright, 1967b. | 1 |
| BUTCOMBE, North Somerset
P.U.B.S.S., 8, ii, (1957-8), 89-96. | 2 |
| CLEEVE HILL, Gloucestershire
Clifford, 1961, 22-3; Marshall, 1978b, 17, fig. 1.10. | 3 |
| CRYPT GRAMMAR SCHOOL, Gloucestershire
<i>Clifford, 1961, 23.</i> | 4 |
| EBWORTH, Gloucestershire
Ant. J., 22, (1942), 216-8. | 5 |
| FOX HILL, Badsey, Gloucestershire
Marshall, 1978a, 9. | 6 |
| KINGS BEECHES, Woodmancote, Gloucestershire
Marshall, 1978a, 9; 1978b, 17. | 7 |
| LECHLADE, Gloucestershire
Barrett, 1975, 111. | 8 |
| LECKHAMPTON HILL, Gloucestershire
Burrow <i>et al.</i> , 1925; Champion, S., 1976; Marshall, 1978b, 22-3. | 9 |
| LILLIESFIELD GRAVEL PIT, Barnwood, Gloucestershire
T.B.G.A.S., lvi, (1934), 227-30. | 10 |
| MEON HILL, Gloucestershire
Marshall, 1978a, 9; 1978b, 24. | 11 |

- MERLIN'S CAVE, Symonds Yat, Gloucestershire 12
Phillips, 1931; Savory, 1971a, 23; 1976b, 249.
- NOTTINGHAM HILL, Gloucestershire 13
Hall and Gingell, 1974.
- PAGAN'S HILL, Chew Stoke, Somerset 14
Rahtz, 1952; ApSimon, Rahtz and Harris, 1957-8.
- ROBINSWOOD HILL, Gloucestershire 15
Clifford, 1931, 23.
- SANDY LANE, Leckhampton, Gloucestershire 16
Purnell and Webb, 1950; Clifford, 1961, 23;
Marshall, 1978a, 9.

WALES AND THE MARCHES

LIST 6; Sites are shown on Map 6

- | | |
|---|---|
| BERWYN MOUNTAINS, Merionethshire | 1 |
| Arch. Camb., (1855), 250-2; Rainbow, 1928, 173;
Grimes, 1946, 68. | |
| DINORBEN, Abergele, Denbighshire | 2 |
| Savory, 1959; Gardner and Savory, 1964;
Savory, 1971a and b; 1976b, 244-7; Alcock, 1972b;
Guilbert, 1979; 1980. | |
| EDDISBURY, Cheshire | 3 |
| Varley, 1950. | |
| FRIDD FALDWYN, Montgomeryshire | 4 |
| O'Neil, 1937b; 1942. | |
| MAIDEN CASTLE, Bickerton, Cheshire | 5 |
| Varley, 1935; 1936; Varley and Jackson, 1940, 69. | |
| MERTHYR MAWR WARREN, Glamorganshire | 6 |
| Wheeler, 1925, 202-3; Fox, 1927; Savory, 1952-3. | |
| TWYN-LLECHFAEN, Brecknockshire | 7 |
| Longworth, 1960, 350; Savory, 1961. | |

UPPER AND MIDDLE THAMES VALLEY AND THE CHILTERN;
"plain ware vessels"

LIST 7: Sites are shown on Map 7.

ALDERMASTON WHARF, Berkshire Bradley <i>et al.</i> , 1980.	1
BALLAST HOLE, Theale, Berkshire Piggott, C.M., 1938.	2
BEEDON MANOR FARM, Berkshire Bradley <i>et al.</i> , 1980, 289.	3
BLEWBURTON HILL, Berkshire Bradford, 1942a.	4
CHASTLETON CAMP, Oxfordshire Leeds, 1931a.	5
COW DOWN, Grim's Ditch, Berkshire Ford and Bowden, 1982, 21-2, 30.	6
FURZE PLATT, Berkshire Lobb, 1979-80, fig. 3.	7
HARTIGAN'S GRAVEL PIT, Buckinghamshire Green, 1974, 12-3.	8
IVINGHOE BEACON, Buckinghamshire Cotton and Frere, 1968, figs. 17-20.	9
KNIGHT'S FARM, Berkshire Bradley <i>et al.</i> , 1980.	10
MAIDENHEAD, Berkshire Barrett, 1979a, 231, fig. 1 (i).	11

PUDDLEHILL I, Chilterns, Buckinghamshire Matthews, 1976; Saunders, 1971, 4, fig. 2.	12
RAMS HILL, Berkshire Barrett, 1975, fig. 3.5.	13
TERRICK, Buckinghamshire Saunders, 1971, 6.	14
TOTTERNHOE, Bedfordshire Hawkes, 1940b.	15

UPPER AND MIDDLE THAMES VALLEY AND THE CHILTERN;
"early decorated assemblages"

LIST 8: Sites are shown on Map 8.

APPLEFORD, Oxfordshire Hinchliffe and Thomas, 1980.	1
BAMPTON, Oxfordshire Harding, 1972, Pl. 46A.	2
BLEWBURTON HILL, Berkshire Collins, 1947, 28.	3
CHURN I, Grim's Ditch, Berkshire Ford and Bowden, 1982.	4
KIRTLINGTON, Oxfordshire Harding, 1966, 158-61, fig. 14.	5
KNIGHT'S FARM, subsites 1 and 3, Berkshire Bradley <i>et al.</i> , 1980, figs. 34-6.	6
LOWBURY HILL, Berkshire Atkinson, 1916, Pl. XVIII, 18.	7
NEW WINTLES FARM, Oxfordshire Harding, 1972, Pl. 49, 80-1.	8
RAMS HILL, Berkshire Piggott and Piggott, 1940, fig. 5, 1-21.	9
STANDLAKE, Oxfordshire Bradford, 1942c.	10
WALLINGFORD, Berkshire Collins, 1948-9; Wymer, 1960; Ehrenberg, 1977, App. II, 59-60.	11

WAYLAND'S SMITHY, Berkshire
Atkinson, 1965.

12

WITTENHAM CLUMPS, Berkshire
Hingley, 1979-80, figs. 8-15.

13

UPPER AND MIDDLE THAMES VALLEY AND THE CHILTERN;
 "developed decorated assemblages"

LIST 9: Sites are shown on Map 9.

ALLEN'S PIT, Oxfordshire Bradford, 1942b.	1
ASHVILLE, Abingdon, Oxfordshire De Roche in Parrington, 1978, 47-50.	2
BLEDLOW, Buckinghamshire Head and Piggott, 1946.	3
ELLESBOROUGH , Buckinghamshire Saunders, 1971, 14, fig. 5, 1.	4
FARMOOR, Oxfordshire Lambrick and Robinson, 1979, 39-43, fig. 21.	5
FRILFORD, Berkshire Bradford and Goodchild, 1939.	6
LONG WITTENHAM, Oxfordshire Savory, 1937, fig. 2.	7
MOUNT FARM, Oxfordshire Myres, 1937, figs. 6-8.	8
PITSTONE, Buckinghamshire Waugh, 1968; Saunders, 1971, 16.	9
PUDDLEHILL, Phase 2, Buckinghamshire Saunders, 1971, 9-17.	10
RADLEY, Oxfordshire Leeds, 1931b, 1935.	11

STANTON HARCOURT, Oxfordshire
Williams, 1951; Hamlin, 1966.

12

WYTHAM, Oxfordshire
Bradford, 1942b, fig. 12, 21-35.

13

EAST MIDLAND PLATEAU

LIST 10: Sites are shown on Map 10.

ECTON, Northamptonshire

1

Jackson, 1973, 31-8.

PARK LODGE QUARRY, Gretton, Northamptonshire

2

Jackson, 1974b.

RAINSBOROUGH, Charlton, Northamptonshire

3

Avery *et al.*, 1967.

RINGSTEAD, Northamptonshire

4

Jackson, 1978, 168.

WEEKLEY HALL WOOD, Northamptonshire

5

Jackson, 1976, 80-2.

SUSSEX AND THE SOUTH COAST

LIST 11: Sites are shown on Map 11.

- | | |
|--|----|
| BELLE TOUT, Sussex
Bradley, 1971c. | 1 |
| BISHOPSTONE, Rookery Hill, Sussex
Bell, 1977. | 2 |
| CABURN, Sussex
Curwen and Curwen, 1927; Wilson, 1939; Hawkes, 1939b. | 3 |
| CASTLE HILL, Newhaven, Sussex
Hawkes, 1939a. | 4 |
| HOLLINGBURY, Sussex
Cunliffe, 1966. | 5 |
| LANCING, Sussex
Sx. A. Colls., 81, (1940), fig. 4a. | 6 |
| LITTLEHAMPTON, Sussex
Bedwin, 1979b. | 7 |
| SLONK HILL, Shoreham, Sussex
Hartridge, 1977-8, fig. 12, 1-17; 14, 81-7, 137. | 8 |
| STOKE CLUMP, Sussex
Cunliffe, 1966. | 9 |
| THUNDERSBARROW HILL, Sussex
Ant. J., 13, (1933), 109-33. | 10 |
| TRUNDLE, Sussex
Curwen, 1929; 1931. | 11 |

THE LOWER THAMES AND ITS ESTUARY

LIST 12: Sites are shown on Map 12.

AMRESBURY BANKS, Essex Rodwell, 1976, 188-9.	1
ASHELDAM CAMP, Essex Rodwell, 1976, 182-3.	2
BEDDINGTON, Surrey Bishop, 1971, fig. 1, 5.	3
CAESAR'S CAMP, Surrey Lowther, 1945.	4
CARSHALTON, Surrey Lowther, 1944-5; Harrison, 1968.	5
COOMBE WARREN, Surrey Bishop, 1971, fig. 1, 2-3.	6
DOWNHAM GRANGE, Essex Rodwell, 1976, 180.	7
FARNHAM (GREEN LANE and SITE 507), Surrey Elsdon, 1982.	8
HAWK'S HILL, Leatherhead, Surrey Hastings, 1966;	9
HEATHROW, Middlesex Grimes, 1979; Champion, 1980c, 238.	10
HIGHSTEAD, Kent Champion, 1980c, 237	11

LANGDON HILLS, Essex Rodwell, 1976, 180.	12
LINFORD, Essex Hawkes, 1962.	13
MILNER'S GRAVEL PIT, Sturry, Kent unpublished B.M.	14
MINNIS BAY, Kent Worsfold, 1943; Champion, 1976, 33-42.	15
MUCKING, Essex Jones and Jones, 1975; Jones and Bond, 1980.	16
OLD ENGLAND, Brentford, Middlesex Wheeler, 1929b; Needham and Longley, 1980, 426.	17
ORSETT, Essex Barrett, 1978, figs. 39 and 40 (1-39).	18
PARK FARM, Great Bromley, Essex Ant. J., 17, (1937), 194-5; T.E.A.S., 22, (1937), 341.	19
PETTER'S SPORTS FIELD, Egham, Surrey O'Connell and Needham, 1977.	20
RAWRETH, Essex Essex Arch. Hist., ix, (1977), 20-47.	21
RUNNYMEDE BRIDGE, Egham, Surrey Longley, 1976, 1980; Needham and Longley, 1980.	22
SANDOWN PARK, Esher, Surrey Burchell and Frere, 1947.	23
SHOEBURY, Essex P.P.S., 25, (1959), 278.	24

- THORNEY BAY, Essex 25
Essex Arch. Hist., v, (1973), 93-4, fig. 14, 44, 46.
- TWITTY FEE, Danbury, Essex 26
Ant. J., 13, (1933), 59-62.
- VINCES FARM, Ardleigh, Essex 27
Erith and Holbert, 1970, fig. 15.
- WESTON WOOD, Albury, Surrey 28
Harding, J.M., 1964.
- YIEWSLEY, Middlesex 29
Champion, 1980c, 237-8.

FENLAND AREA, NORFOLK AND SUFFOLK

LIST 13: Sites are shown on Map 13.

- | | |
|--|----|
| ABINGTON PIGOTTS, Cambridgeshire
Fox, 1922-4, 214. | 1 |
| BADWELL ASH, Norfolk
Ant. J., 1935, 15, 474-5. | 2 |
| BARROW HILL, Thetford, Norfolk
Clark, 1939, 27. | 3 |
| BRAMPTON PIECE, Aylsham, Norfolk
Clarke, 1960, 399. | 4 |
| CAT'S ROAD, Fengate
Pryor, 1980, 151, fig. 89, 4-6. | 5 |
| HILLS ROAD, Cambridge, Cambridgeshire
Collins, 1948; Fell, Lethbridge and Bushnell, 1949. | 6 |
| HOME FARM, Kettleburgh, Suffolk
O'Connor, 1973-5; Balkwill, 1979. | 7 |
| LAKENHEATH, Suffolk
Briscoe, 1948-9. | 8 |
| MICKLEMOOR HILL, West Harling, Norfolk
Clark and Fell, 1953. | 9 |
| NEWARK ROAD, Fengate
Pryor, 1976, fig. 3.5 (12); 1980, 103, fig. 61. | 10 |
| WARBOROUGH HILL, Stiffkey, Norfolk
Clarke and Apling, 1935. | 11 |
| WILBURY HILL, Letchworth, Hertfordshire
Applebaum, 1949, fig. 15, 8; Eccardt, 1964. | 12 |

WITHAM-TYNE AREA

LIST 14: Sites are shown on Map 14.

- | | |
|---|---|
| (BILLINGBOROUGH (Phase 3), Lincolnshire
Chowne, 1978; 1979; 1980.) | 1 |
| EPPERSTONE, Nottinghamshire
Challis and Harding, 1975, fig. 9.4, 5. | 2 |
| GRAFTON, Yorkshire
Waterman <i>et al.</i> , 1952-5. | 3 |
| HEATHERY BURN, Stanhope, Co. Durham
Inv. Arch., G.B.55. | 4 |
| HOLME PIERREPOINT, Nottinghamshire
Challis and Harding, 1975, fig. 9.2. | 5 |
| ISLAND CARR, Brigg, Lincolnshire
May, 1976, 112-4. | 6 |
| RED HILL, Nottinghamshire
Challis and Harding, 1975, fig. 10, 6, 7. | 7 |
| WASHINGBOROUGH, Lincolnshire
May, 1976, 109-112; Chowne, 1980, 300;
Needham and Longley, 1980, 427-8. | 8 |
| WILLINGTON, Derbyshire
Elsdon, 1979. | 9 |

TYNE-TAY REGION AND HIGHLAND SCOTLAND

LIST 15: Sites are shown on Map 15.

BALEVULLIN, Tiree MacKie, 1962-3.	1
BALMASHANNER, Angus Anderson, 1891-2.	2
BISHOP'S LOCH, Old Monkland, Lanarkshire Cree and Curle, 1921-2, 217; Manning and Saunders, 1972, 290.	3
BROXMOUTH, Dunbar, East Lothian Hill, 1982c.	4
CASTLE POINT, Cullykhan, Banff Greig, 1970; 1971; 1972.	5
ELL'S KNOWE, Northumberland Burgess, 1978.	6
FINAVON, Angus Childe, 1934-5; 1935-6.	7
HAYHOPE KNOWE, Roxburghshire Piggott, C.M., 1948-9.	8
HOWNAM RINGS, Roxburghshire Piggott, C.M., 1947-8.	9
INGRAM HILL, Northumberland Hogg, 1942; 1956; Jobey, 1971.	10
JARLSHOF, Sumburgh, Shetland Curle, 1933-4; Hamilton, 1956.	11

KAIMES HILL, Midlothian
Simpson, 1969.

12

TRAPRAIN LAW, East Lothian
Curle and Cree, 1920-21; Cree and Curle, 1921-2;
Jobey, 1976.

13

APPENDICES

APPENDIX I: LIST OF BRITISH JOURNALS SEARCHED

A systematic search was made of the national and county journals listed below; unless dates are shown in parentheses, the checking of complete runs prior to 1981 is implied.

Antiquaries Journal.
 Antiquity.
 Archaeologia.
 Archaeologia Aeliana.
 Archaeologia Cambrensis.
 Archaeologia Cantiana.
 Archaeological Journal.
 Archaeology in Wales.
 Bedfordshire Archaeological Journal.
 Berkshire Archaeological Journal (formerly Berks., Bucks. and Oxon. Arch. Soc.).
 Berwickshire Naturalist.
 Britannia.
 Brycheiniog (1963 ff.).
 Bulletin of the Board of Celtic Studies.
 Bulletin of the University of London Institute of Archaeology.
 Bulletin of the Wealden Iron Research Group.
 Colchester Archaeological Group Bulletin.
 Cornish Archaeology.
 Current Archaeology.
 Derbyshire Archaeological Journal.
 Discovery and Excavation in Scotland.
 Durobrivae.
 East Hertfordshire Archaeological Society Transactions.
 East Midland Archaeological Society Bulletin (1963 ff.).
 Flintshire Historical Society Publications.
 Hertfordshire Archaeology.
 Journal of the British Archaeological Society.
 Journal of the Chester and North Wales Architectural, Archaeological and Historical Society (1900 ff.).
 Journal of the Royal Institution of Cornwall (1900 ff.).
 Journal of the Thurrock Local History Society (later Panorama).

Kent Archaeological Review.
 Lichfield and South Staffordshire Archaeological and Historical
 Society Proceedings.
 Monmouthshire Antiquary.
 Montgomeryshire Collections.
 Morgannwg (1973 ff.).
 Norfolk Archaeology (1900 ff.).
 Northamptonshire Archaeology.
 North Staffordshire Journal of Field Studies.
 Oxford University Archaeological Society Reports (1900 ff.).
 Oxoniensia.
 Proceedings of the Cambridge Antiquarian Society.
 Proceedings of the Cotteswold Naturalists' Field Club (1970 ff.).
 Proceedings of the Devonshire Archaeological Exploration Society.
 Proceedings of the Dorset Natural History and Archaeological
 Society (1900 ff.).
 Proceedings of the Hampshire Field Club and Archaeological Society.
 Proceedings of the Isle of Man Natural History and Antiquarian
 Society (1956 ff.).
 Proceedings of the Isle of Wight Natural History and Archaeological
 Society.
 Proceedings of the Prehistoric Society (previously of East Anglia).
 Proceedings of the Society of Antiquaries of London (1843 ff.).
 Proceedings of the Society of Antiquaries of Scotland (1890 ff.).
 Proceedings of the University of Bristol Spelaeological Society.
 Proceedings of the West Cornwall Field Club.
 Records of Buckinghamshire (1900 ff.).
 Reports and Papers of the Lincolnshire Architectural and
 Archaeological Society (later Lincolnshire History and Archaeology).
 Scottish Archaeological Forum.
 Somerset Archaeological Journal (1900 ff.).
 Staffordshire Archaeology.
 Surrey Archaeological Collections.
 Sussex Archaeological Collections (1900 ff.).
 Sussex Notes and Queries.
 Transactions of the Architectural and Archaeological Society of
 Durham and Northumberland (1900 ff.).
 Transactions of the Birmingham Archaeological Society.
 Transactions of the Bristol and Gloucestershire Archaeological
 Society (1900 ff.).

- Transactions of the Cardiff Naturalists' Society (1961 ff.).
- Transactions of the Carmarthenshire Antiquarian Society.
- Transactions of the Cumberland and Westmoreland Antiquarian and Archaeological Society.
- Transactions of the Devonshire Association (1900 ff.).
- Transactions of the Dumfriesshire and Galloway Natural History and Antiquarian Society.
- Transactions of the East Lothian Antiquarian and Field Naturalists' Society.
- Transactions of the Essex Archaeological Society.
- Transactions of the Glasgow Archaeological Society (later Glasgow Archaeological Journal).
- Transactions of the Hunter Archaeological Society.
- Transactions of the Lancashire and Cheshire Antiquarian Society (1900 ff.).
- Transactions of the London and Middlesex Archaeological Society.
- Transactions of the Newbury District Field Club.
- Transactions of the Scarborough and District Archaeological Society.
- Transactions of the Shropshire Archaeological and Natural History Society.
- Transactions of the South Staffordshire Archaeological and Historical Society (previously The Lichfield Archaeological and Historical Society).
- Transactions of the Woolhope Naturalists' Field Club (1900 ff.).
- Transactions of the Worcestershire Archaeological Society.
- Vale of Evesham Historical Society Research Papers.
- Wiltshire Archaeological and Natural History Magazine.
- Yorkshire Archaeological Journal.

APPENDIX II: LIST OF ASSEMBLAGES STUDIED AT FIRST HAND

- ALL CANNINGS CROSS, Wiltshire (Devizes Museum).
 BALMASHANNER, Angus (National Museum of Antiquities of Scotland).
 BINDON HILL, Dorset (Dorset County Museum).
 BOSCOMBE DOWN EAST, Wiltshire (Devizes Museum).
 BREIDDIN, Montgomery, Wales (National Museum of Wales).
 BUDBURY, Wiltshire (Devizes Museum).
 CASTLE HILL, Scarborough, Yorkshire (Scarborough Museum).
 COLD KITCHEN HILL, Wiltshire (Devizes Museum).
 COWDERY'S DOWN, Hampshire (Department of Archaeology, Durham).
 FRIDD FALDWYN, Montgomery (National Museum of Wales).
 HAWK'S HILL, Surrey (Castle Arch Museum, Guildford).
 HAYHOPE KNOWE, Roxburghshire (National Museum of Antiquities of Scotland).
 HEATHROW, Middlesex (Grimes' excavations: Museum of London).
 HIGHFIELD, Wiltshire (Salisbury and South Wiltshire Museum).
 KAIMES, Midlothian (National Museum of Antiquities of Scotland).
 KNIGHT'S FARM, Berkshire (Reading Museum).
 LANGTON MATRAVERS, Dorset (Dorset County Museum; British Museum).
 LIDBURY, Wiltshire (Devizes Museum).
 LLYN FAWR, Glamorgan (National Museum of Wales).
 MELKSHAM, Wiltshire (Devizes Museum).
 MILL HILL, Deal, Kent (British Museum).
 MILNER'S GRAVEL PIT, Sturry, Kent (British Museum).
 MINNIS BAY, Kent (British Museum).
 MUCKING, Essex (Thurrock Local History Museum).
 OLIVER'S CAMP, Wiltshire (Devizes Museum).
 PETTER'S SPORTS FIELD, Egham, Surrey (British Museum).
 PIMPERNE, Dorset (Department of Archaeology, Edinburgh).
 RAINSBOROUGH, Northamptonshire (Ashmolean Museum).
 RUNNYMEDE BRIDGE, Egham, Surrey (Guildford Museum and British Museum).
 SOMPTING, Sussex (Worthing Museum).
 STAPLE HOWE, Yorkshire (British Museum).
 ST CATHARINE'S HILL, Hampshire (Winchester Museum).
 TRAPRAIN LAW, East Lothian (National Museum of Antiquities of Scotland).
 WILTROW, Shetland (National Museum of Antiquities of Scotland).

APPENDIX III: METALLURGICAL REPORTS

BALMASHANNER, Angus

iron ring: NMA. hoard DQ 131-93.

National Museum of Antiquities, Edinburgh: Lab. ref. no. 6599;
XRF no. FO 768B.

Iron, small amount of copper on surface at least, and end shows copper and zinc. Where surface was cleaned, base metal is iron. Possibly copper plated.

HAMPTON COURT, THAMES, London

bronze spearhead with iron rivet: LM. A27215.

Museum of London Conservation Laboratory: X-ray no. X0202.

X-ray showed that the area of the rivet was not as dense as the surrounding copper alloy. A spot-test for iron was positive, and there is some iron corrosion product evident.

WILTROW, Shetland

iron slag: NMA. HD 1936, 42, 531.

		Wt. %
Iron oxide	Fe_2O_3	51.6
Silica	SiO_2	40.2
Alumina	Al_2O_3	3.7
Titania	TiO_2	0.6
Manganese oxide	MnO	0.1
Lime	CuO	0.8
Magnesia	MgO	trace
Phosphorus	P_2O_5	trace

loss on ignition @ 900°C 3.0

Report from J. Cleland, University of Cambridge, reads as follows:

"My first impression was to say 'iron pan', but on closer inspection the material has clearly been molten and has, in parts, a distinct metallic lustre. Also the sharp edges on fracture, the vesicules in it (are indicative of such an identification). From the appended analysis it is clear that the silica content is highish but not prohibitively so. The same may be said of the alumina figure. I think therefore that both these are due to entrapped soil or clay. The iron oxide is reasonable for a primitive slag. The appended ternary shows the position of your material expressed in terms of iron oxide, silica and anorthite and although it is a little bit off the Romano-British range of compositions, it is not wildly so, especially if some of the silica comes from entrapped soil. To sum up, I think these are ironmaking slags, their nature seems to indicate a fairly primitive process, but beyond that I cannot go."

KNIGHT'S FARM, subsite 1, Pit 5, Berks.

Dull red grits protruding from the surface of six sherds from this feature were extracted and analysed by energy dispersive electron microprobe. The results are as follows:

<i>Sample</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
SiO ₂	5.99	6.87	7.35	8.56	2.45	4.80
TiO ₂	0.33	0.29	0.26	-	0.12	0.14
Al ₂ O ₃	4.47	4.78	4.21	4.86	4.54	10.11
FeO	57.14	55.36	63.86	67.85	64.18	63.05
<hr/>						
MnO	0.38	-	-	0.36	-	0.21
MgO	-	0.27	0.33	0.27	-	-
CaO	3.29	2.89	1.62	0.62	0.22	0.19
K ₂ O	0.37	0.31	0.38	0.33	-	0.26
P ₂ O	13.49	14.69	7.98	1.84	1.36	1.94

(To convert FeO to Fe₂O₃, multiply by 1.113.)

I thank Dr Peter Hill of the Electron Microprobe Unit, Department of Geology, University of Edinburgh for his help in preparing the samples and running the programme.

APPENDIX IV:

Geological systems		Formations containing workable ore	Variety of ore	Location in which ore is worked	
<i>Cretaceous</i>	Upper				
	Lower	Lower Greensand Middle Neocomian	limonite limonite	Seend, Wilts. Tealby & Claxby, Lincs; Weald	
<i>Oolite</i>	Upper				
	Middle	Coral Rag	siderite & limonite	Westbury	
	Lower	Northants. Sand	siderite & limonite magnetite	Cleveland, Northants., Lincs., Rutland Rosedale	
<i>Lias</i>	Upper				
	Middle	Marlstone Rock Beds	siderite & limonite	Cleveland, Lincs., Leics., Oxon.	
	Lower		limonite & siderite	Frodingham	
<i>Carboniferous</i>		Coal Measures	siderite	Scotland, Yorks, Derby, Staffs., Salop., Warwicks., South Wales	
		Yoredale Rocks	siderite & limonite	Weardale, Alston Moor	
		Carboniferous Limestone	siderite limonite haematite	Northumberland Forest of Dean, Glamorgan West Cumberland, Furness	
<i>Devonian</i>	Upper				
	Middle		siderite & limonite haematite magnetite	Somerset	Devon Cornwall
	Lower				
<i>Silurian</i>	Upper				
	Lower	Carboniferous Limestone	haematite	Water Blean, Cumb.	
		Skiddaw Slates	haematite	Knockmurton and Kelton Fell, Cumb.	

(after Kendall, 1893, 53) .

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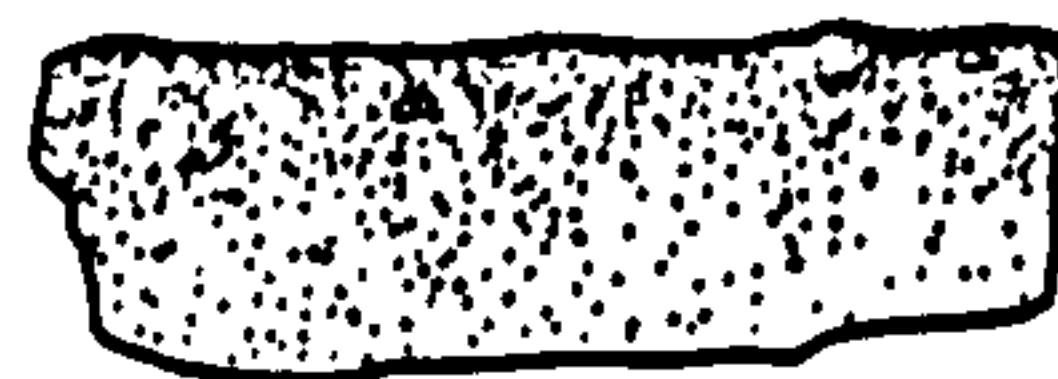
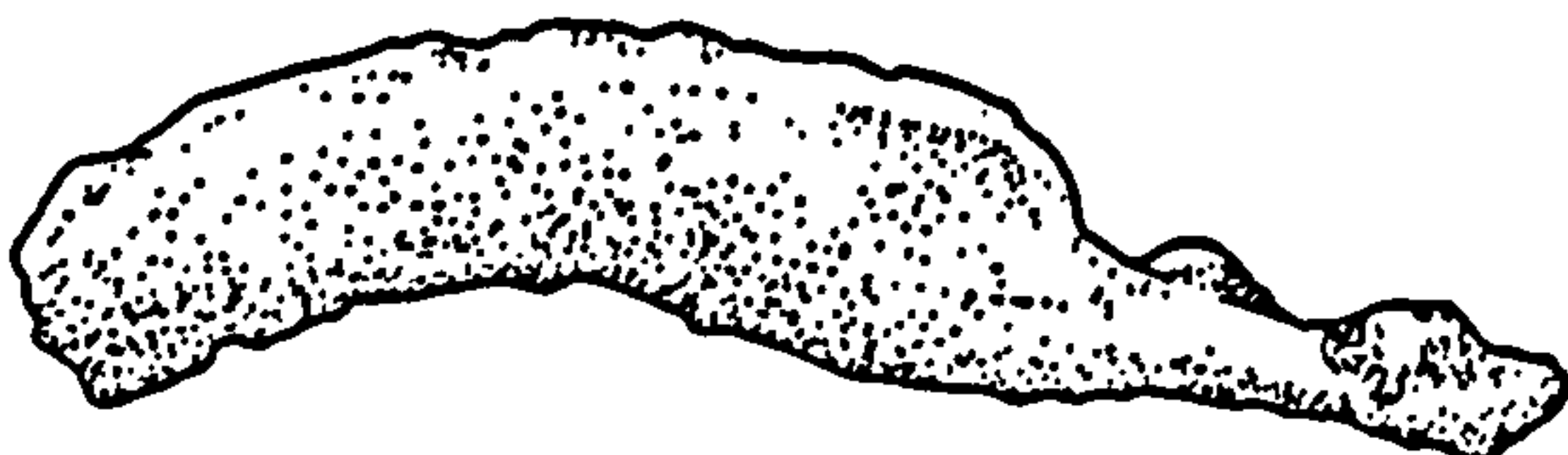
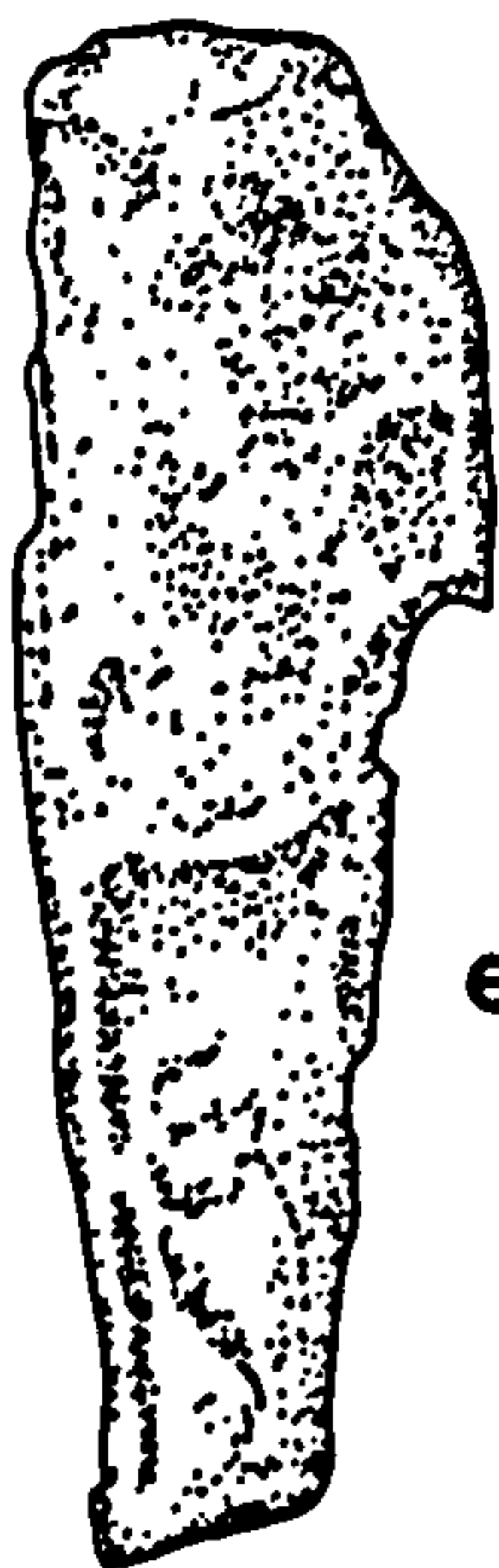
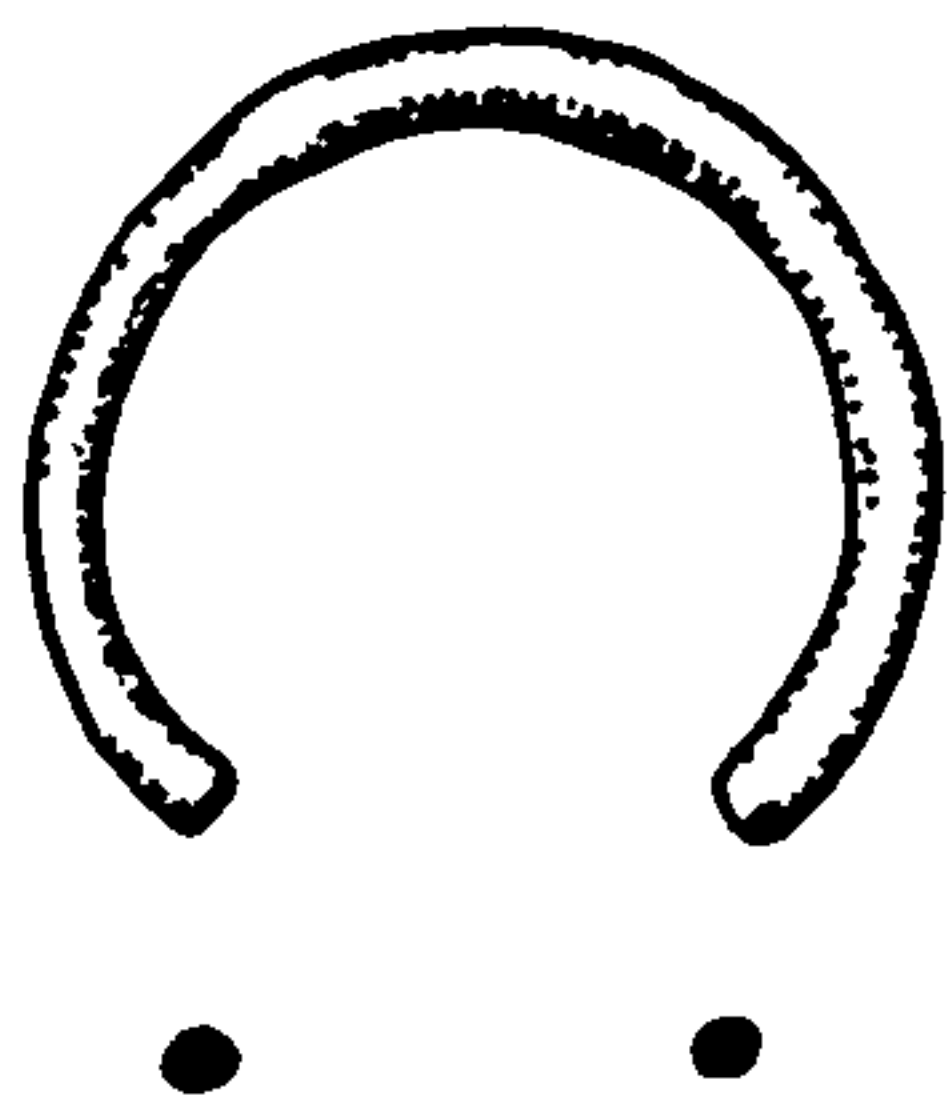
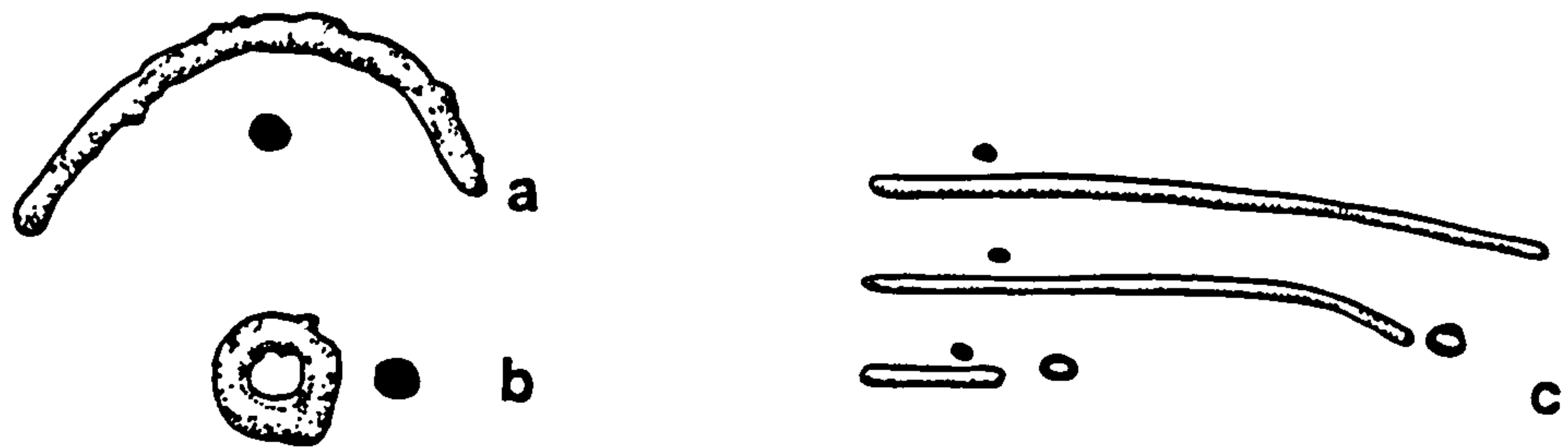


FIG. 3

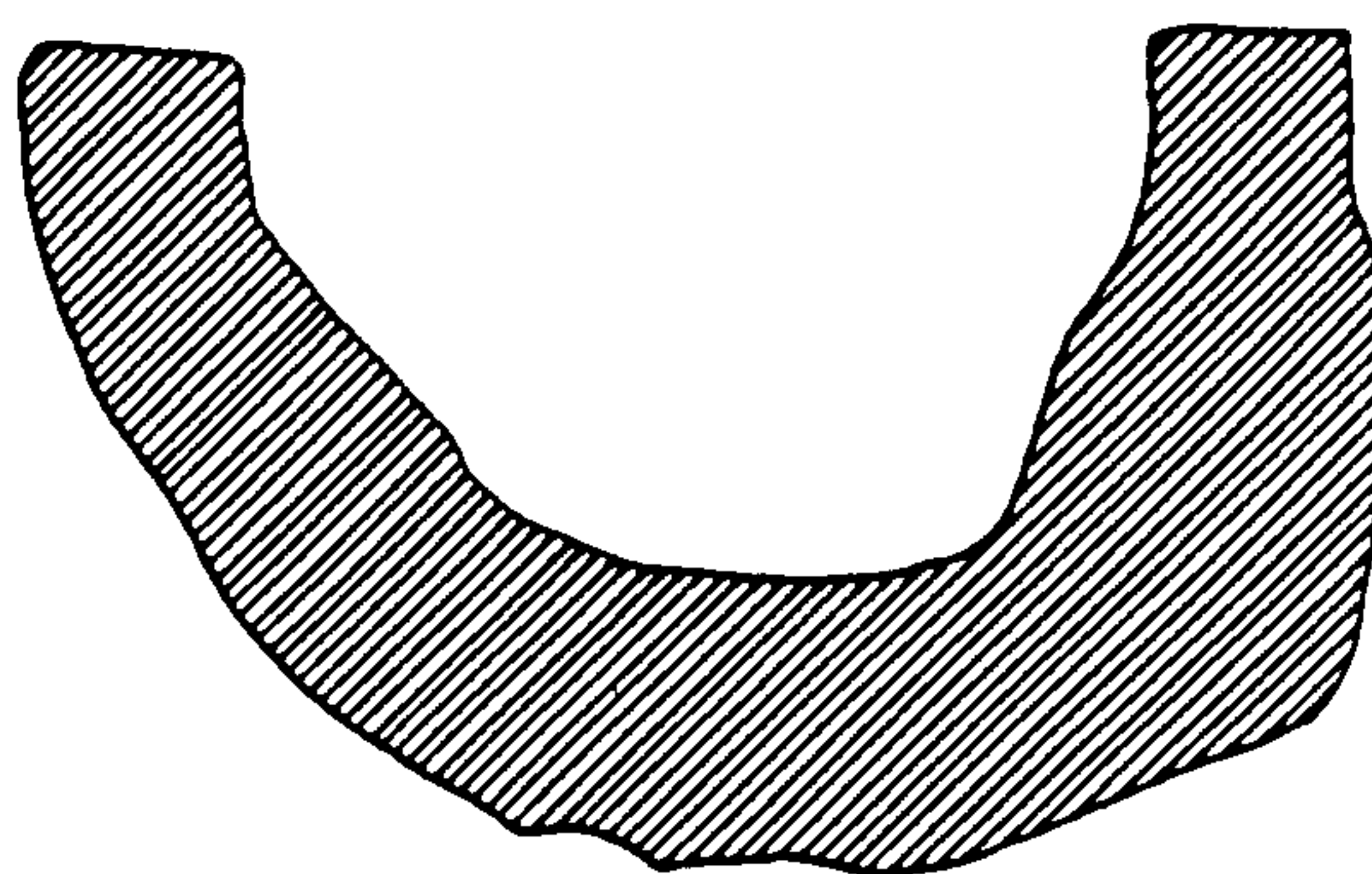
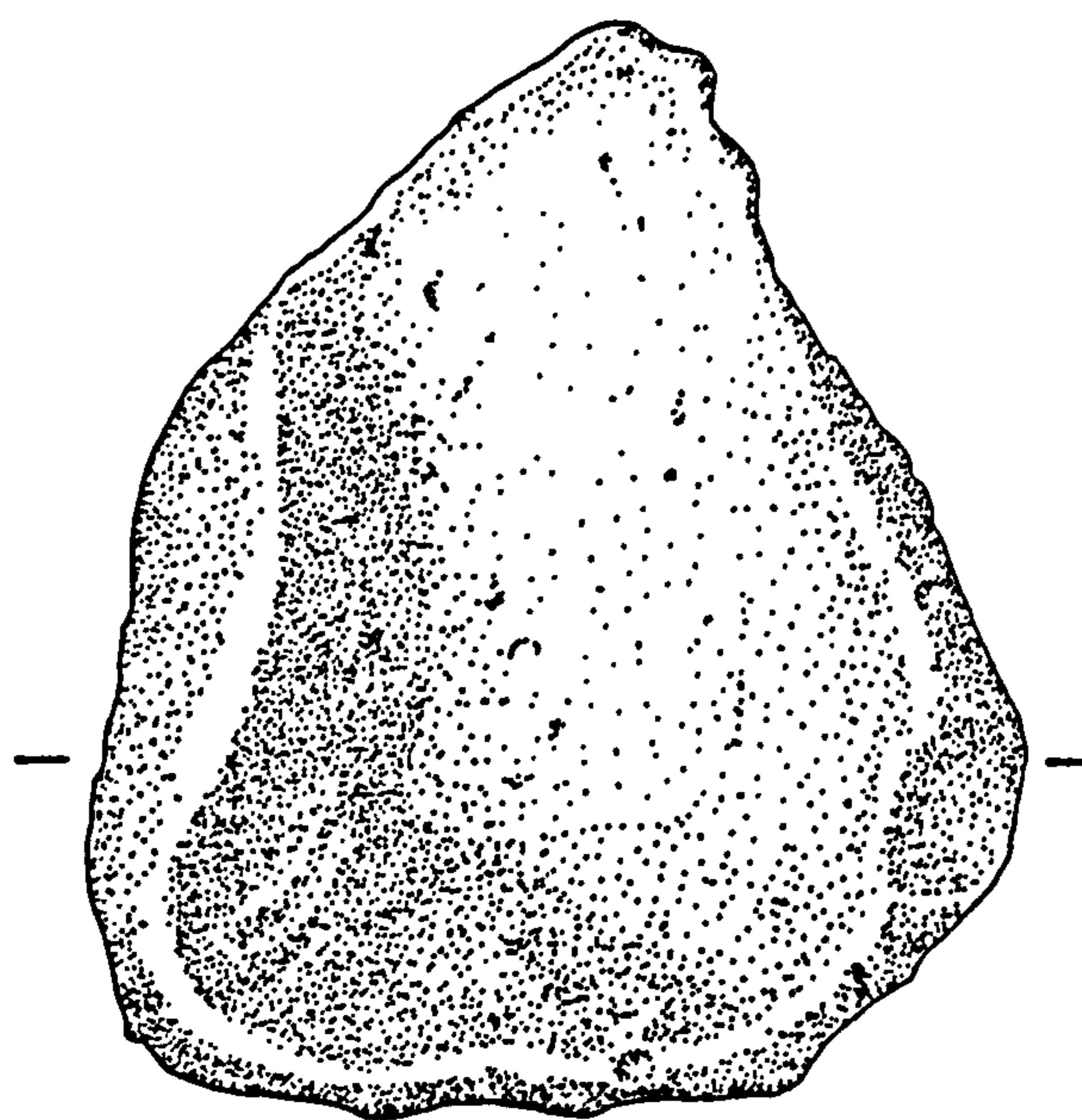
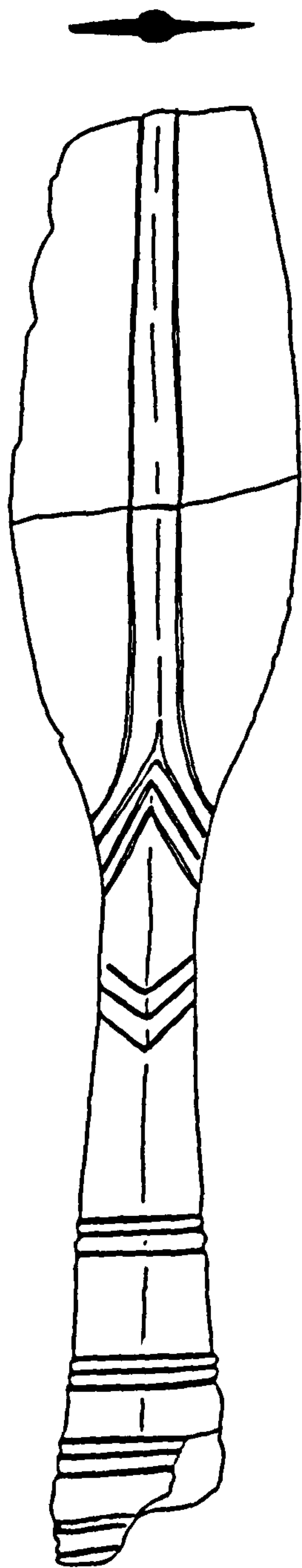
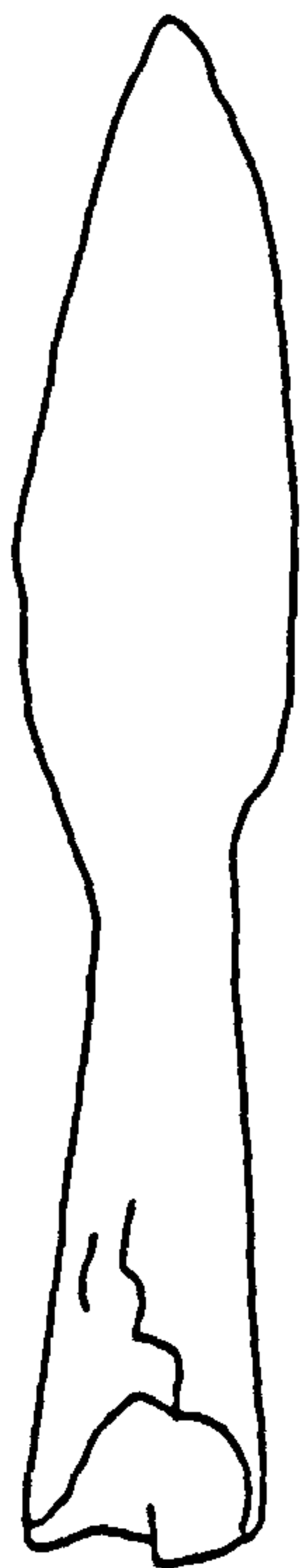


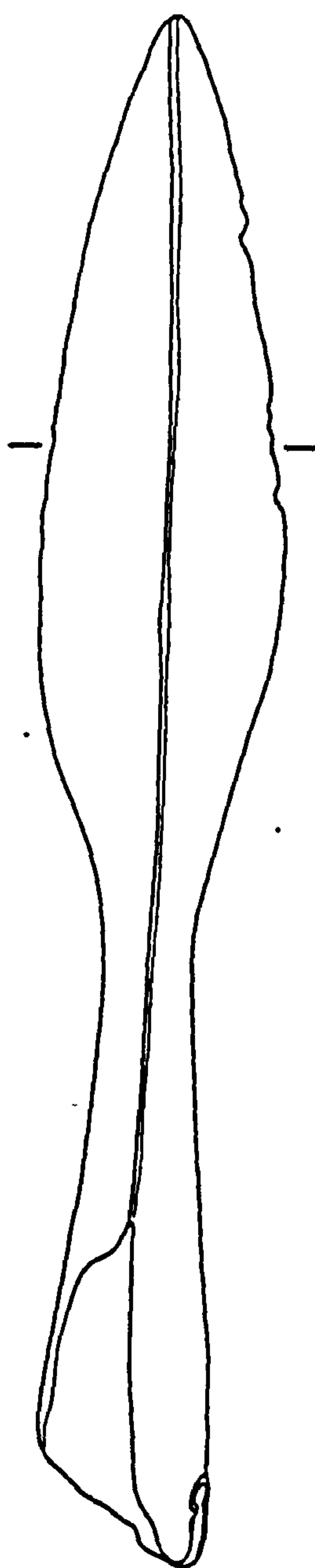
FIG.4



a



b



c



FIG.5

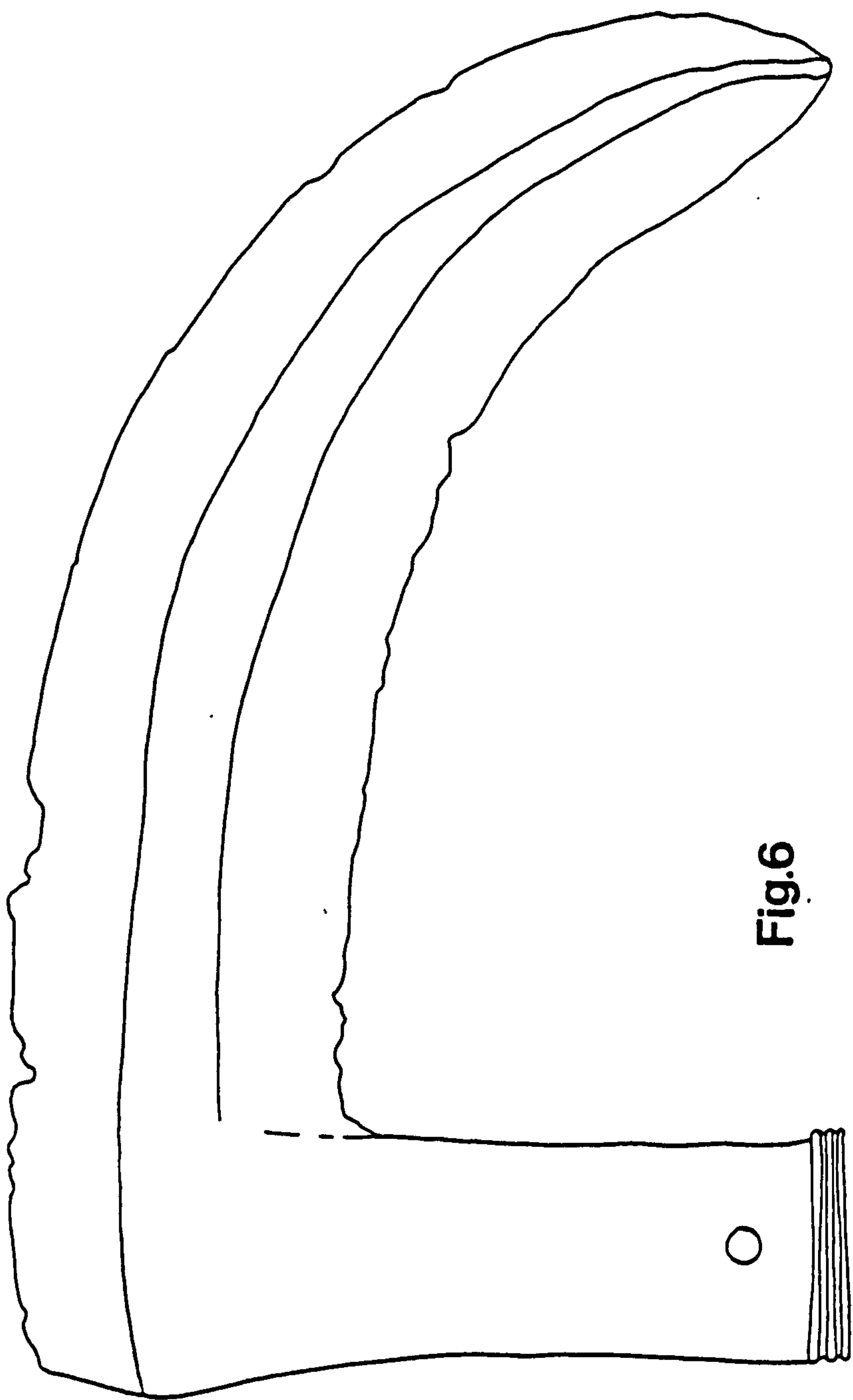


Fig.6

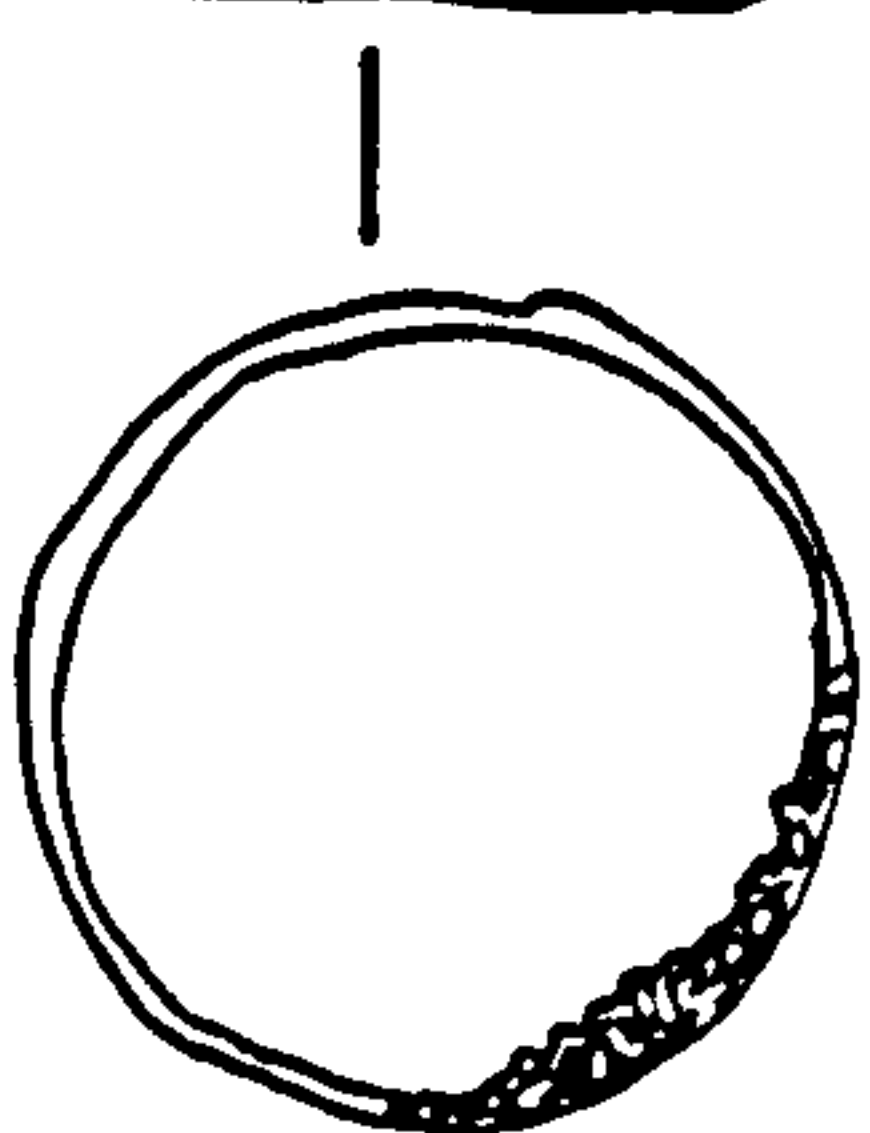
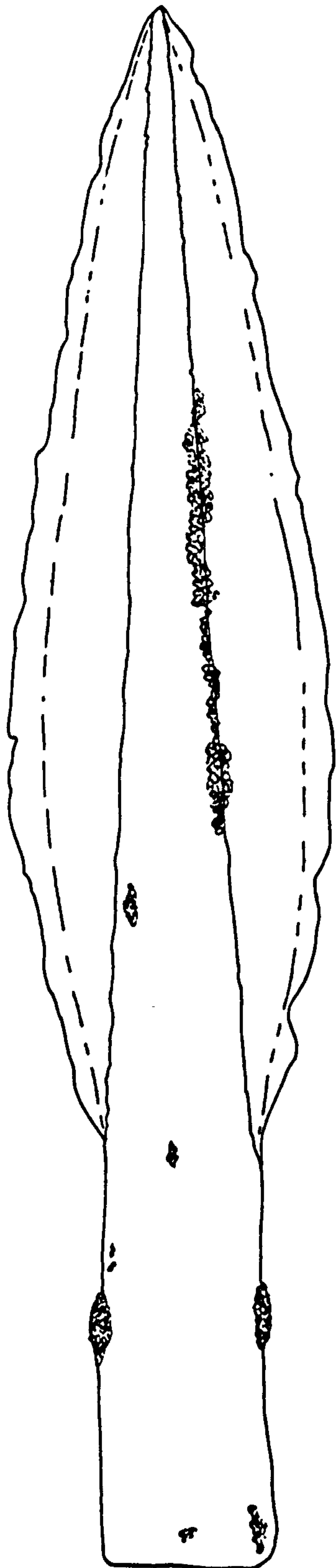


Fig.7

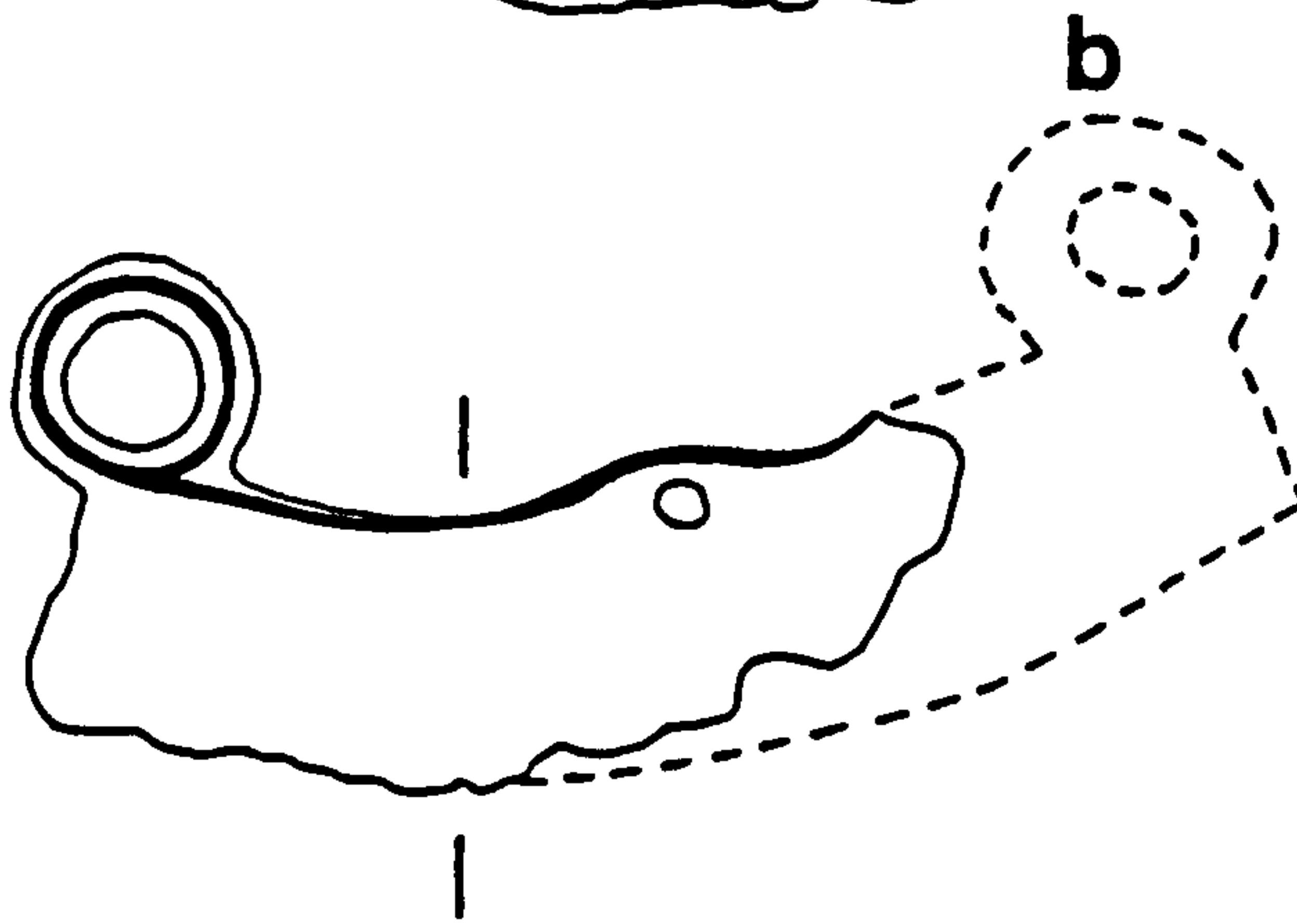
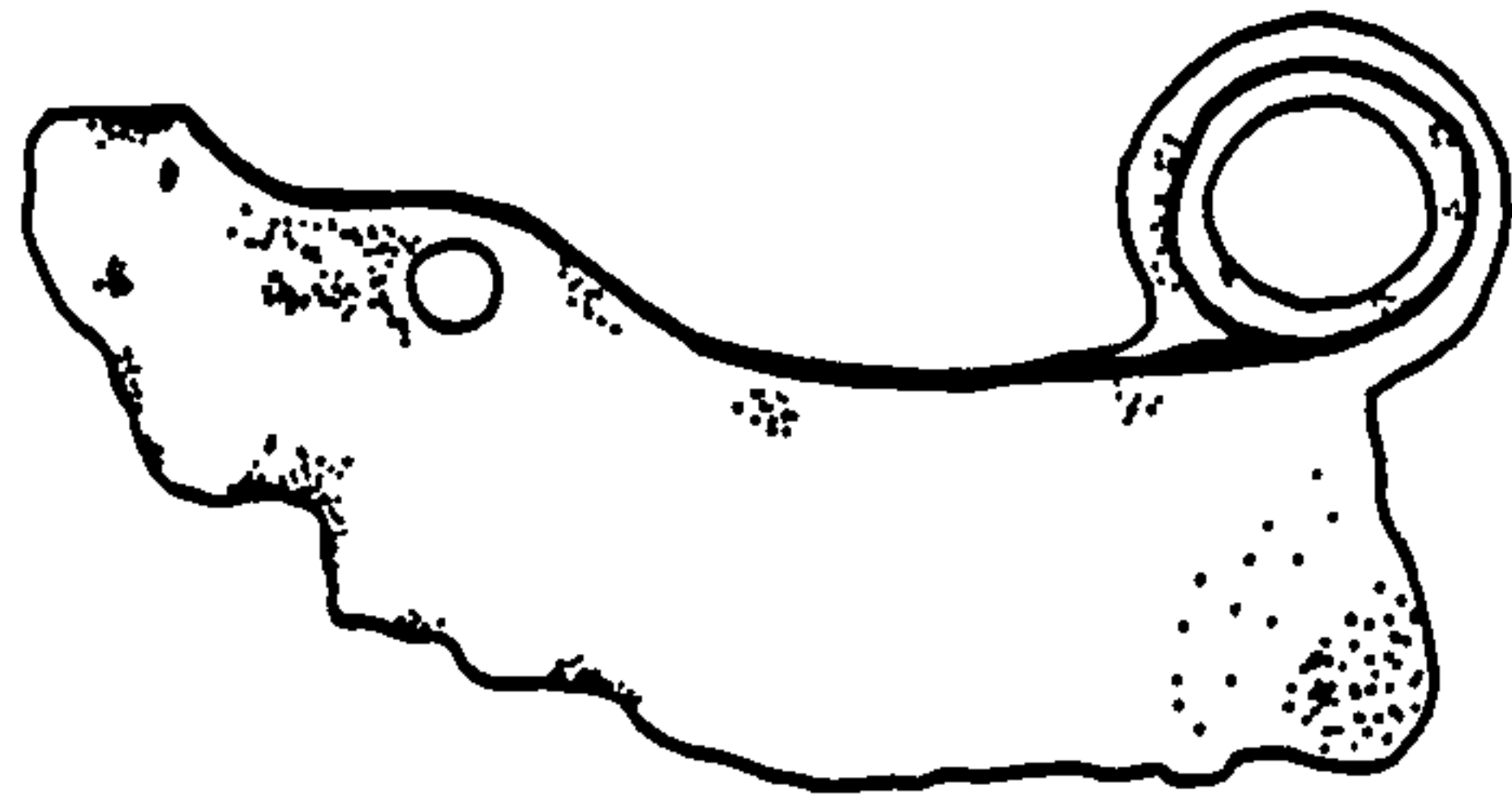


Fig.8

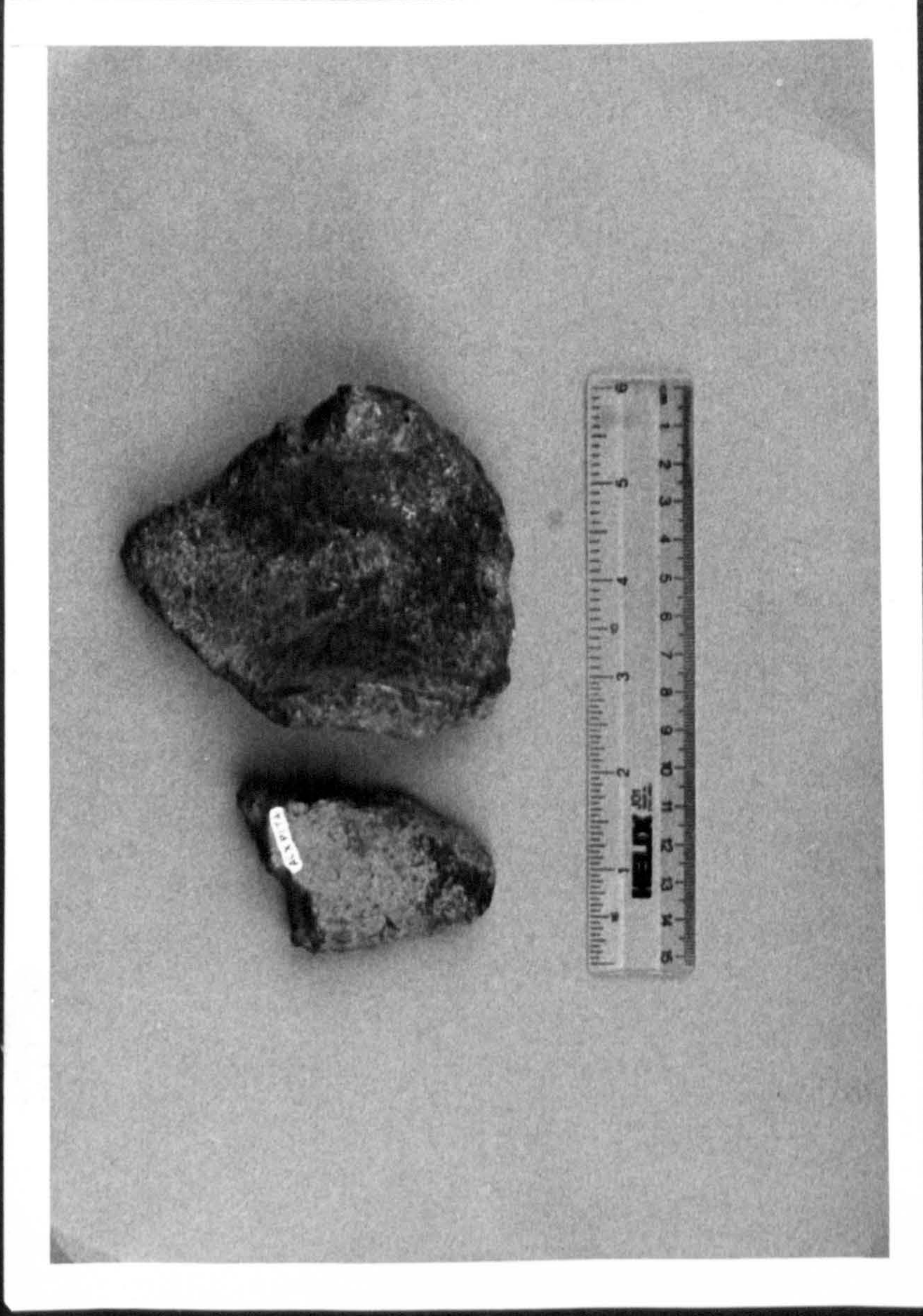


PLATE 1



PLATE 2

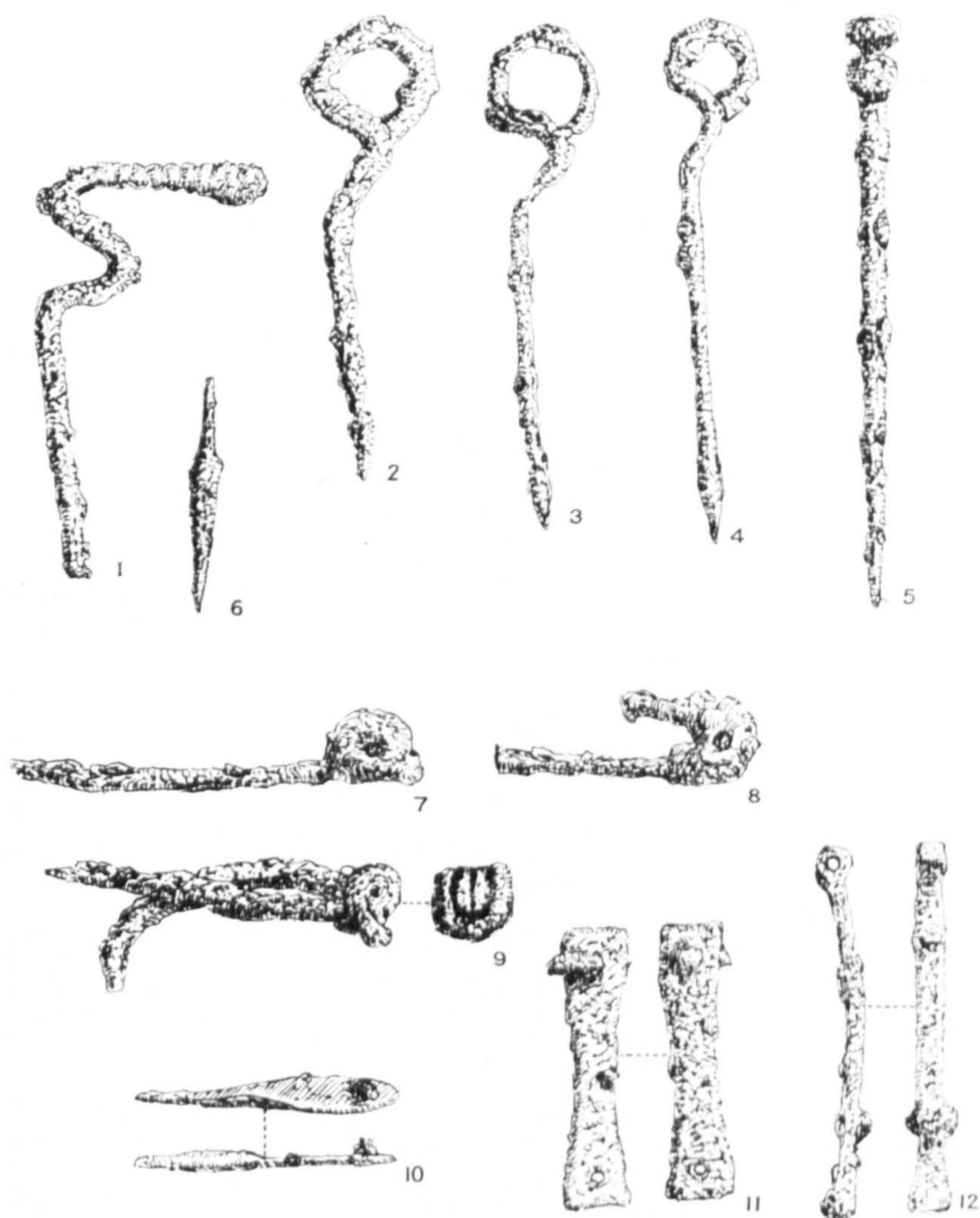


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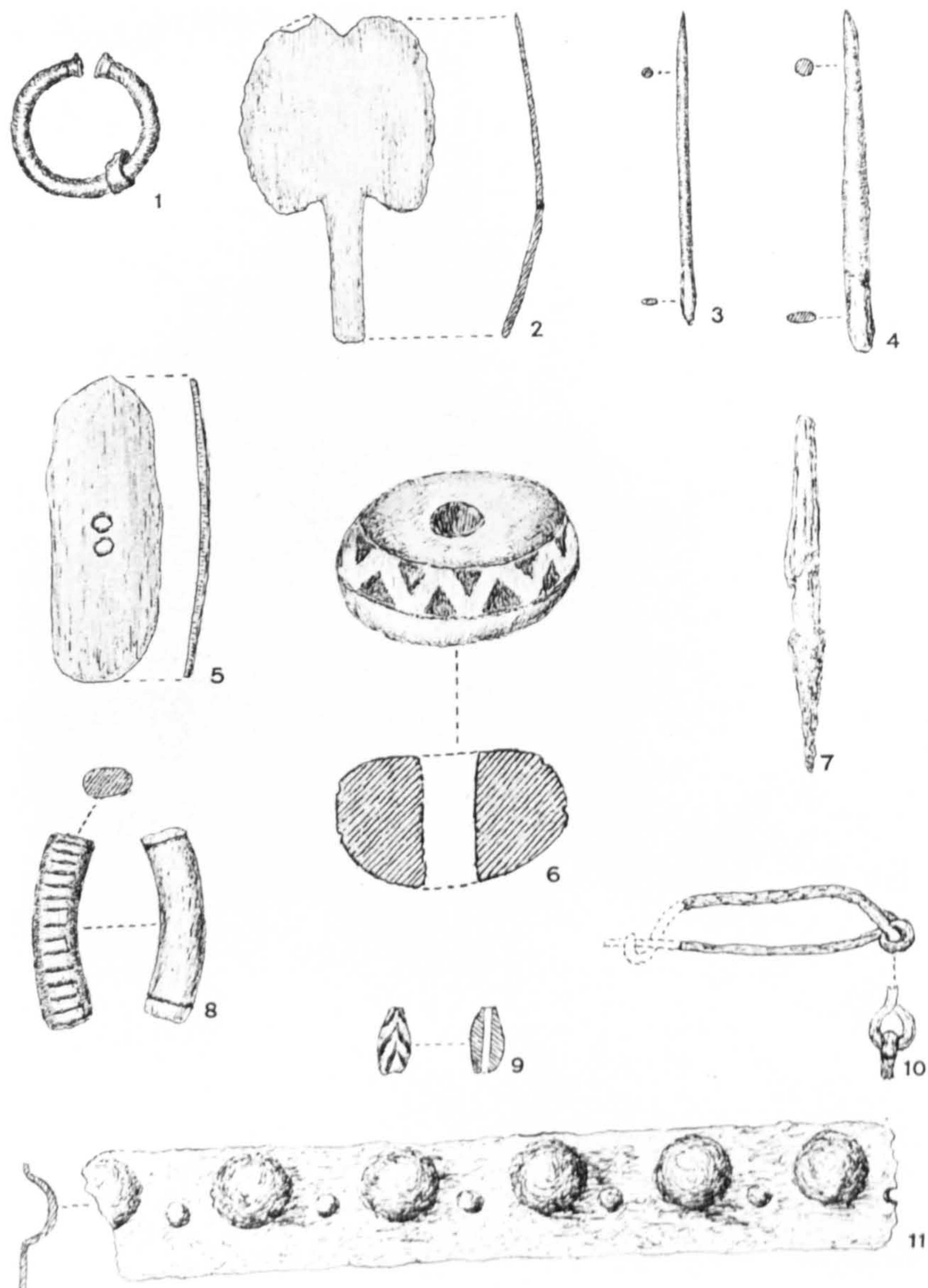


PLATE 4



PLATE 5

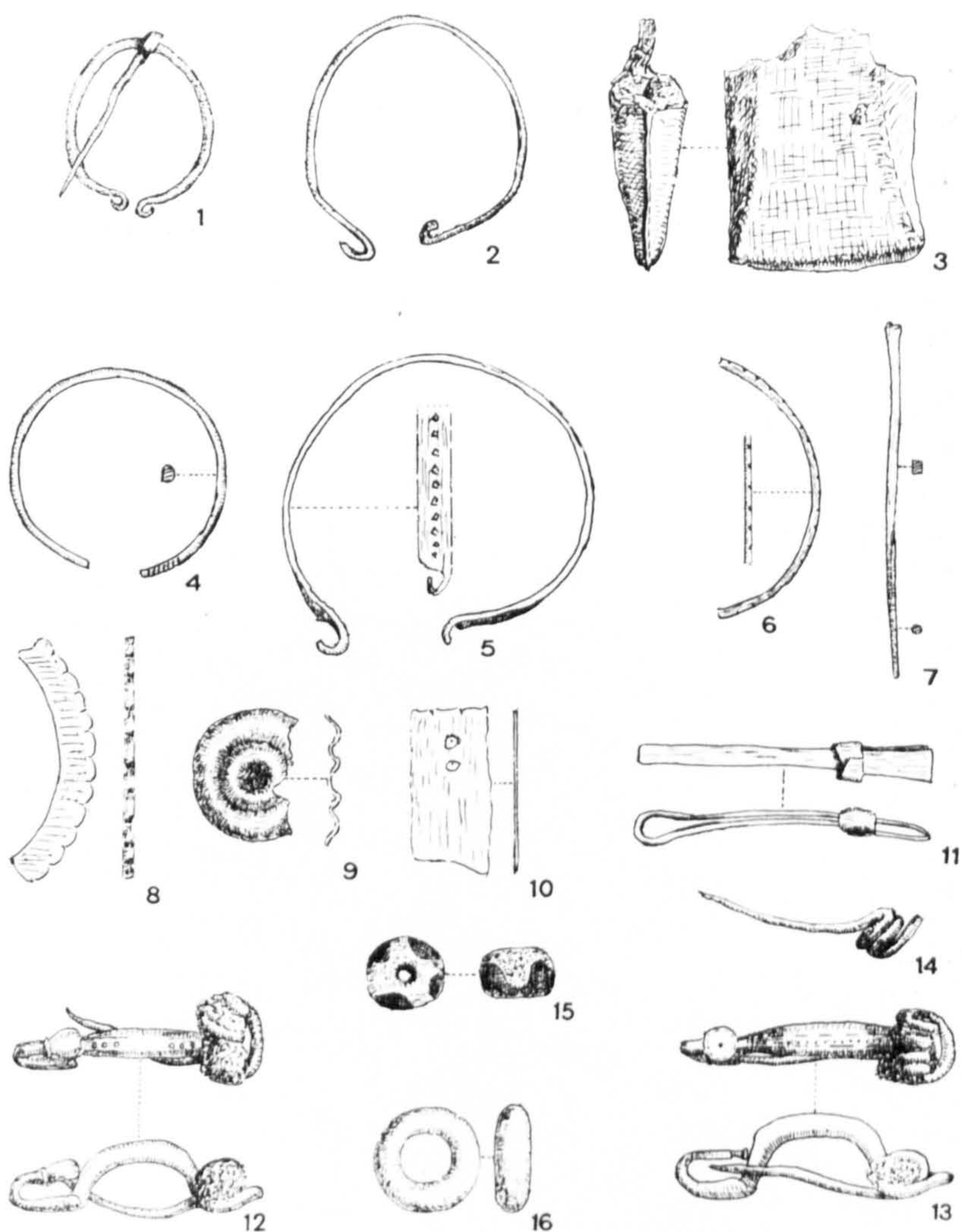


PLATE 6



PLATE 7



PLATE 8

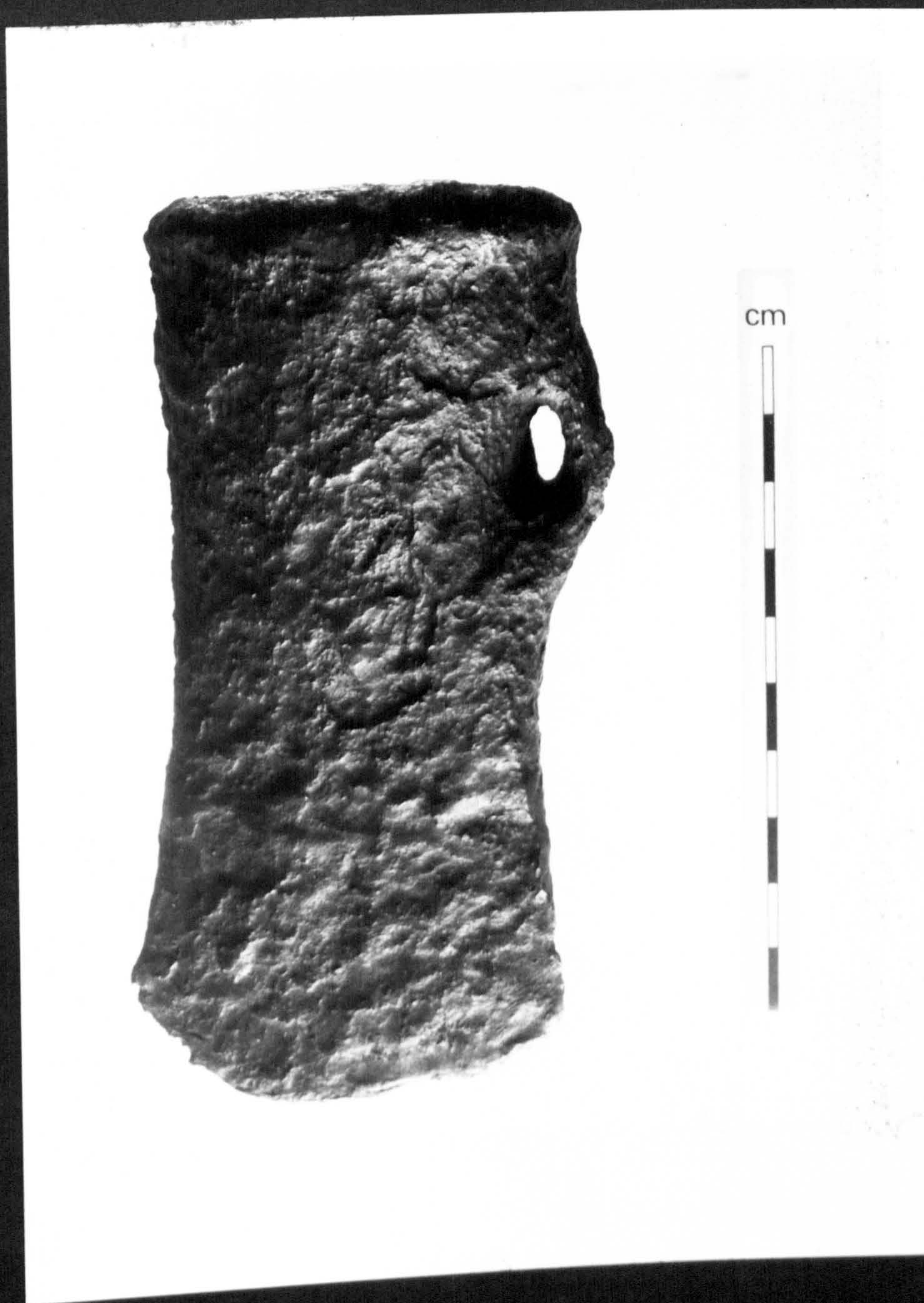


PLATE 9



PLATE 11

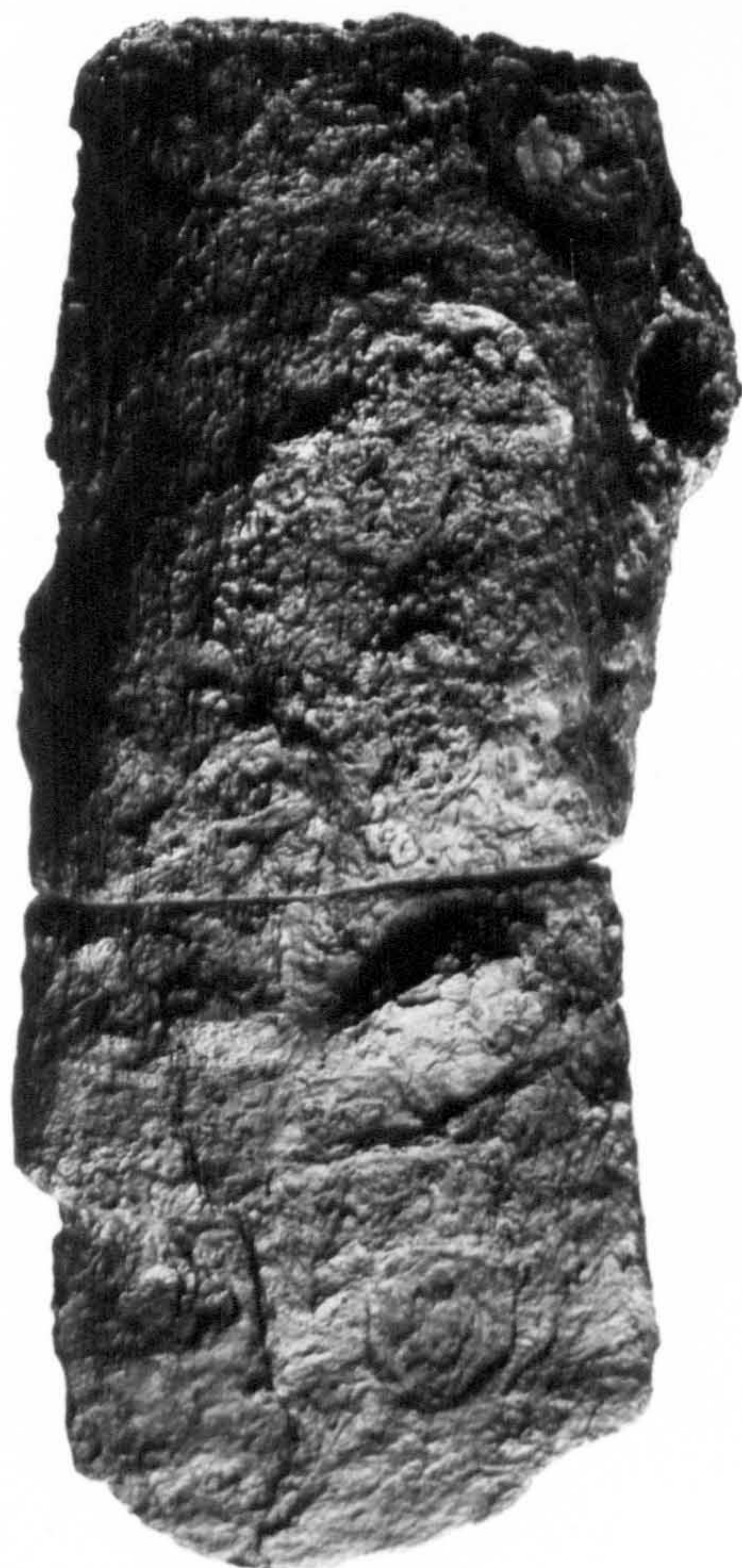
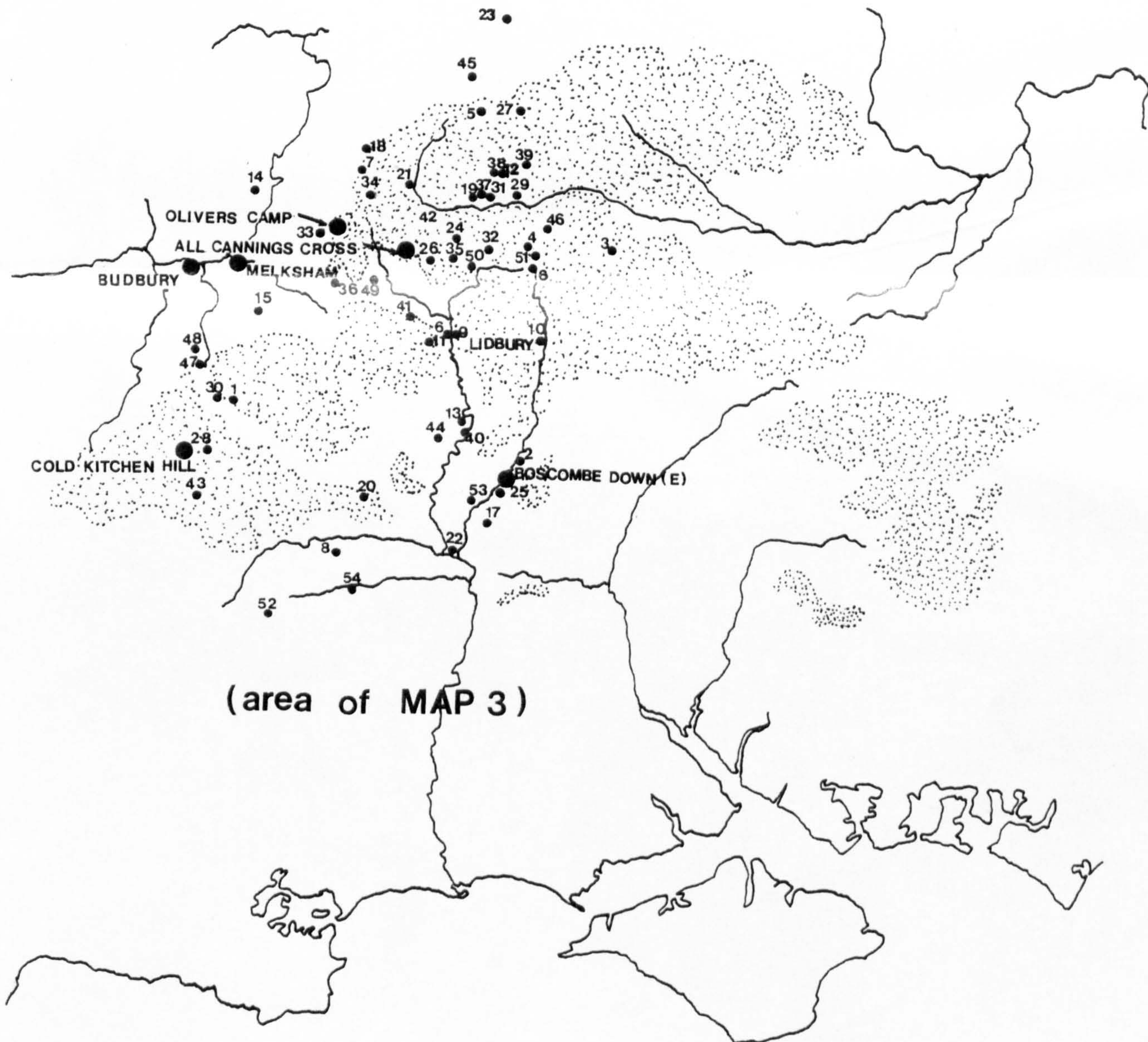


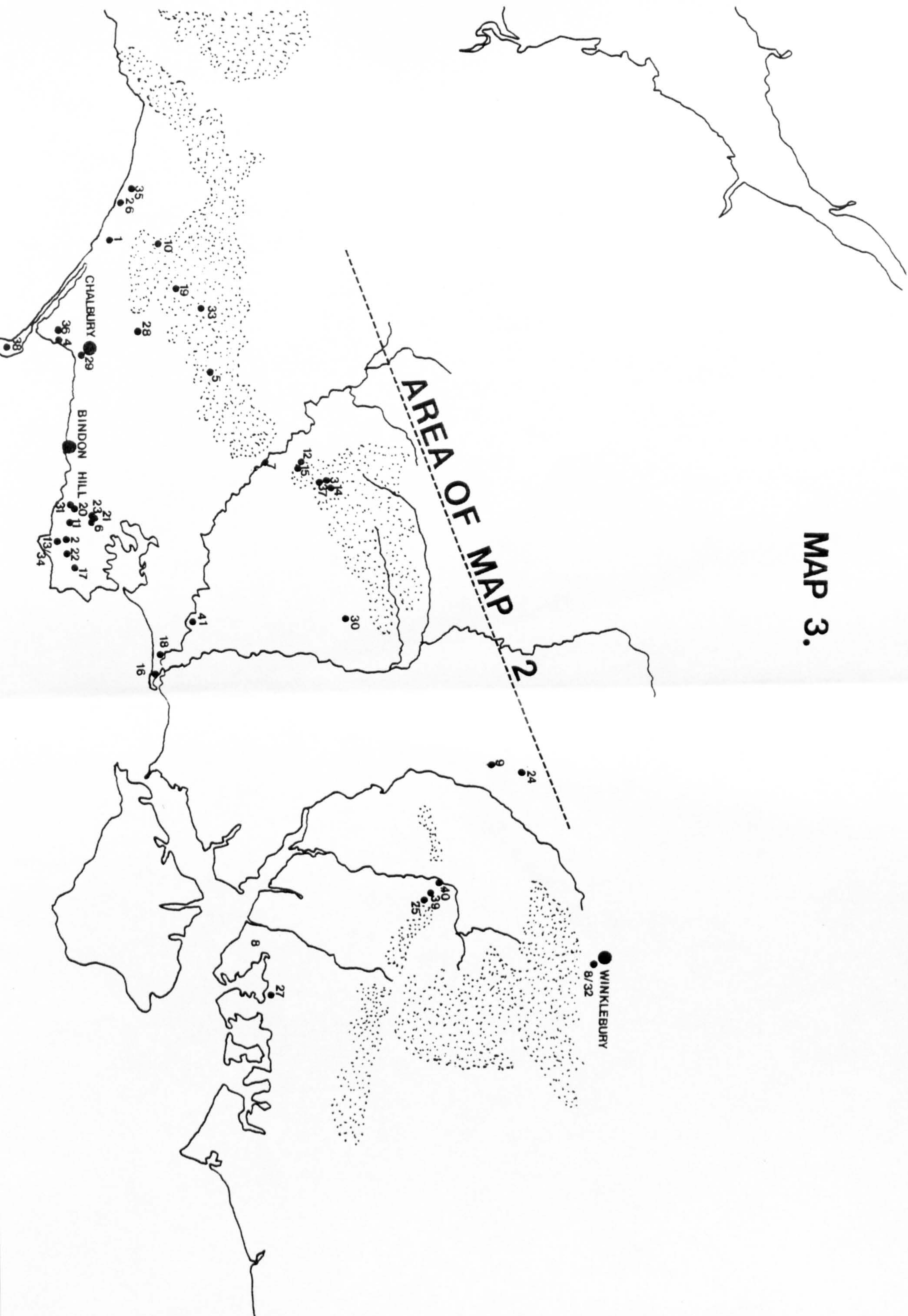
PLATE 12

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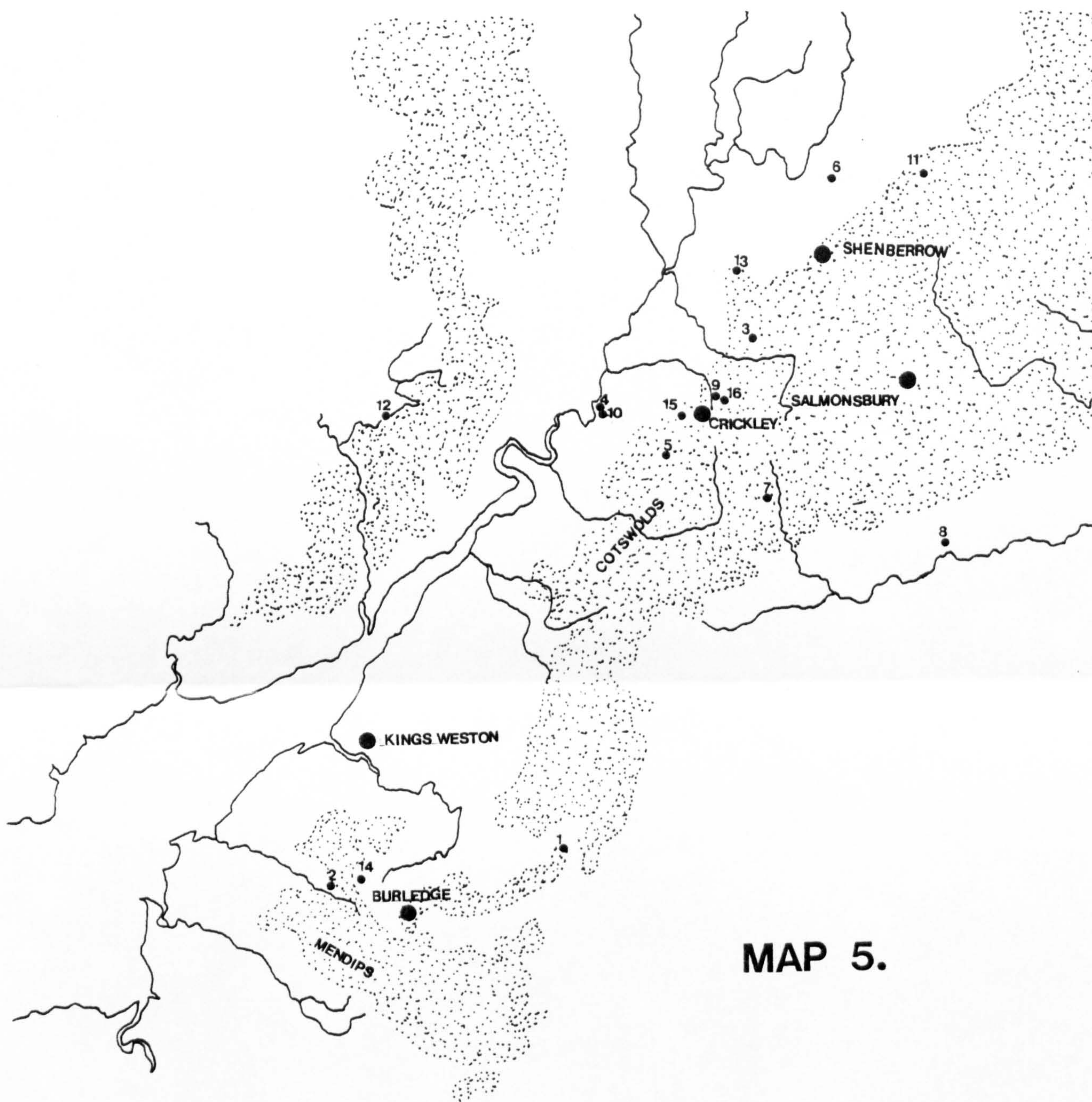


MAP 3.





MAP 4.

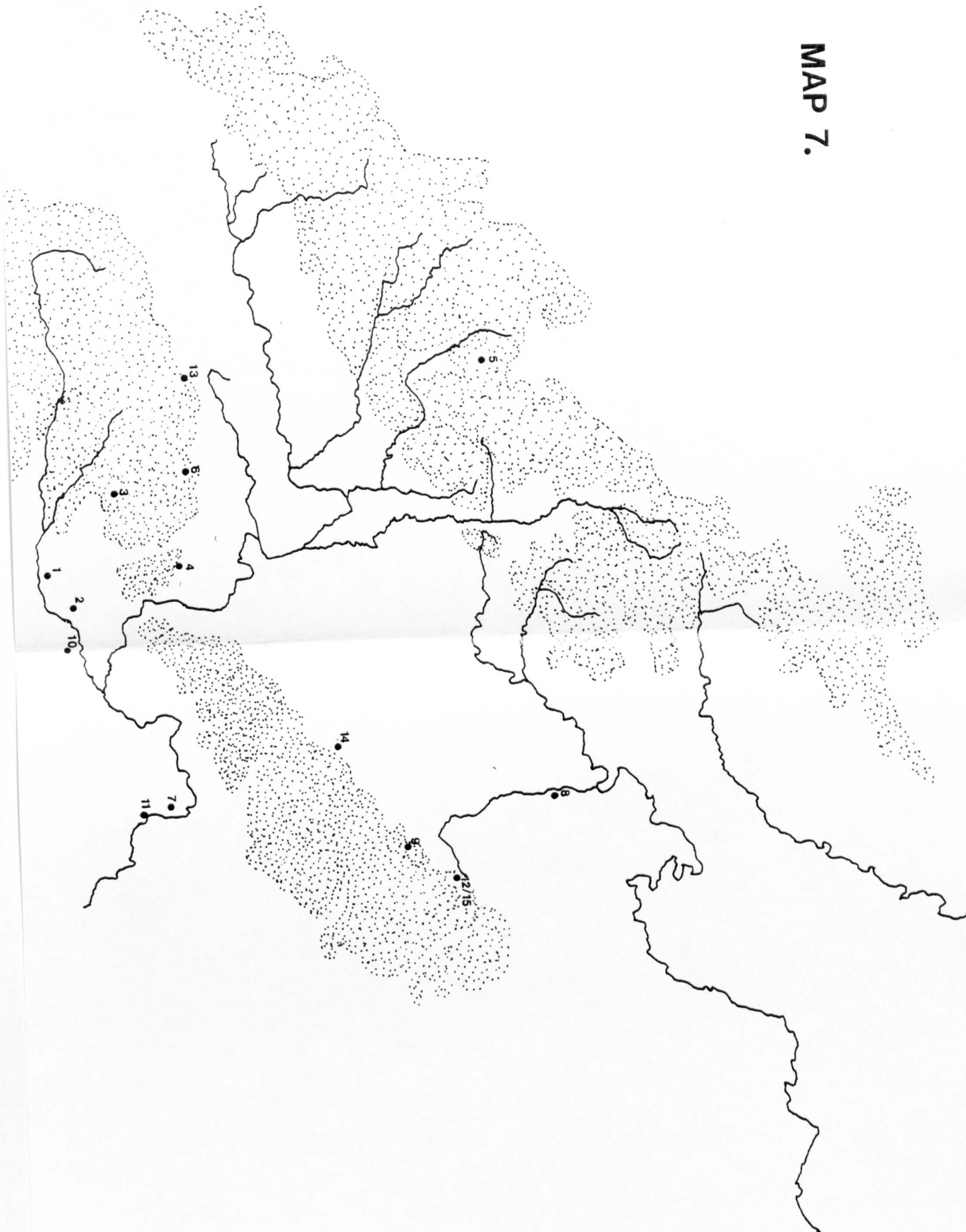


MAP 5.

MAP 6.



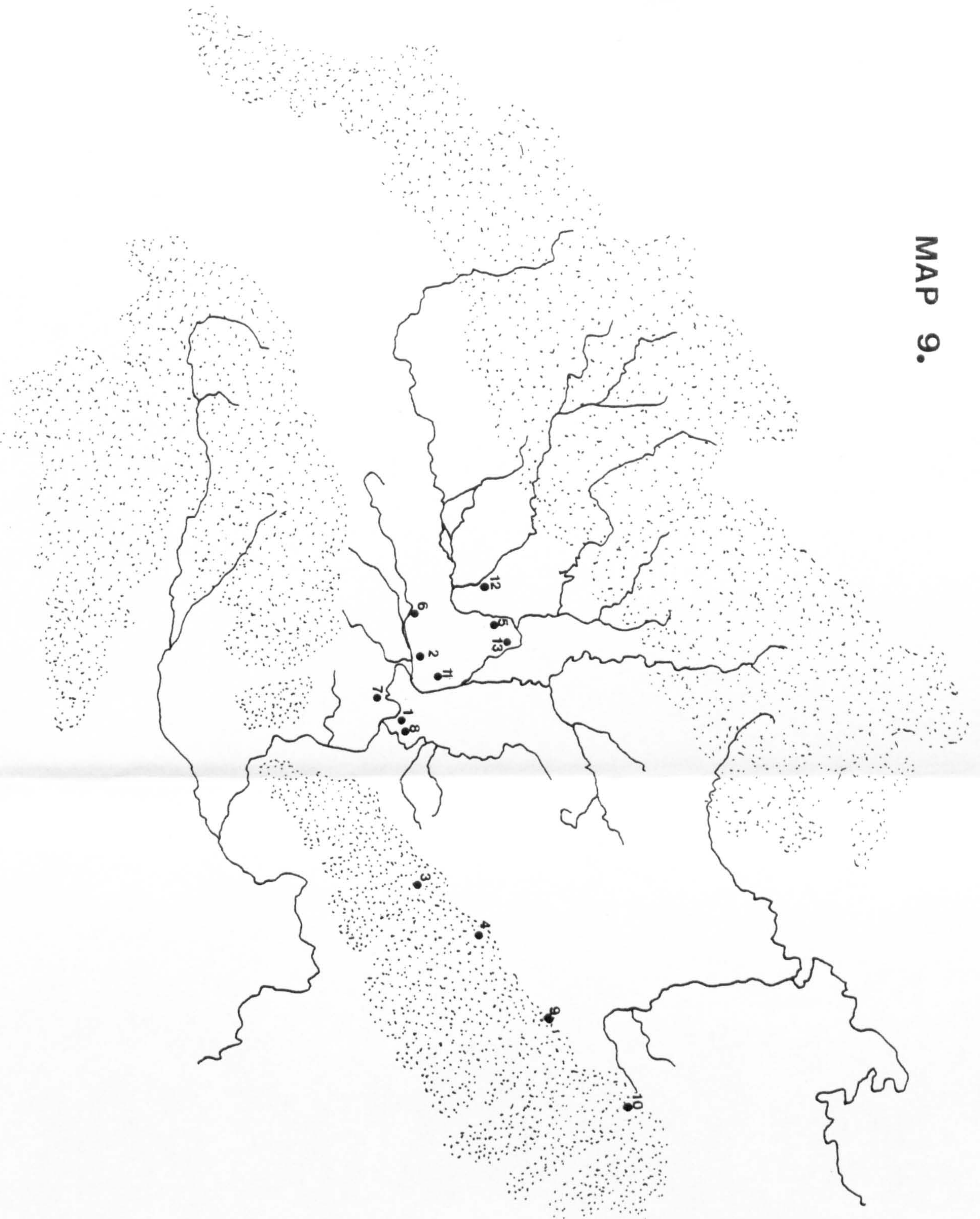
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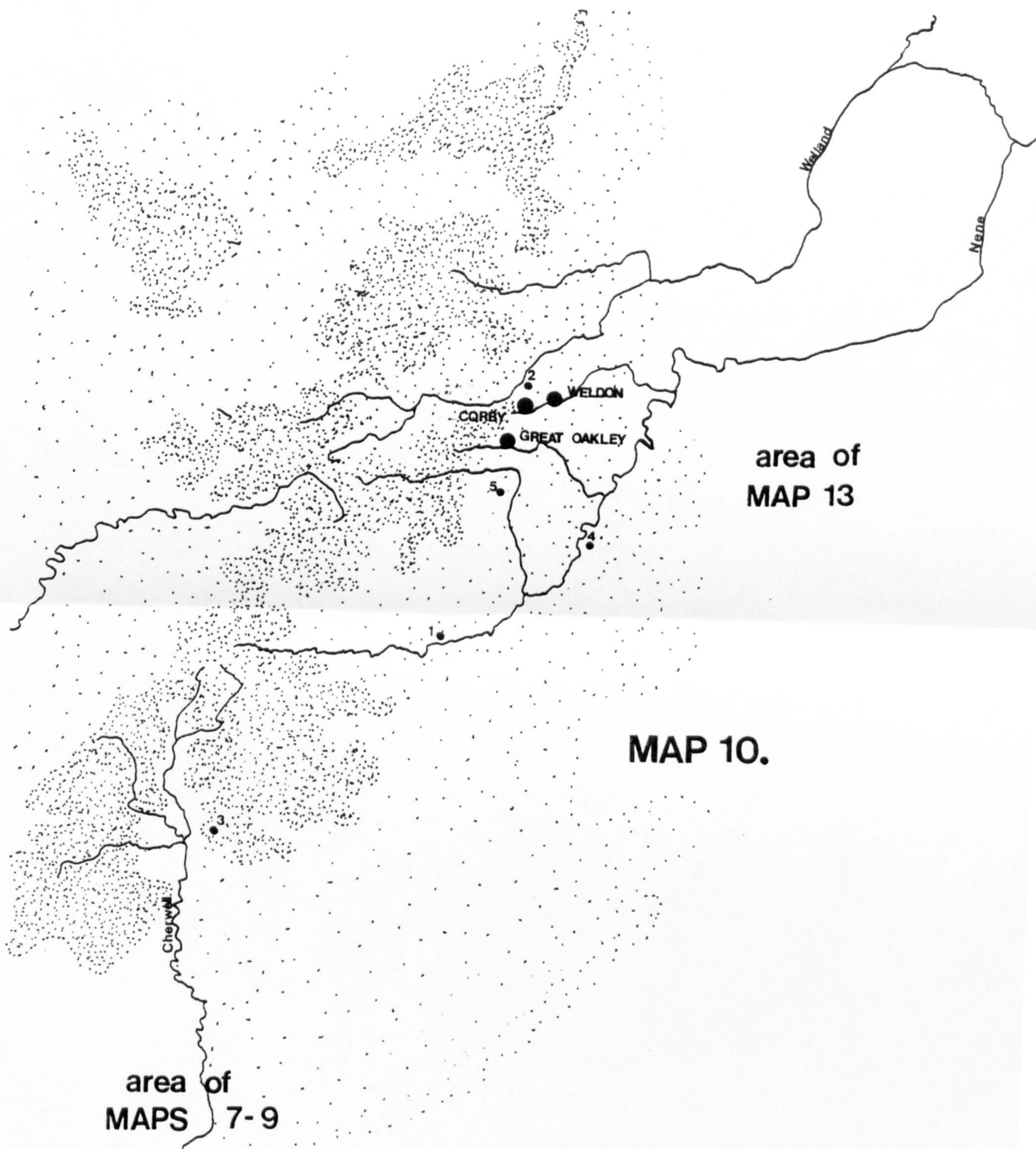


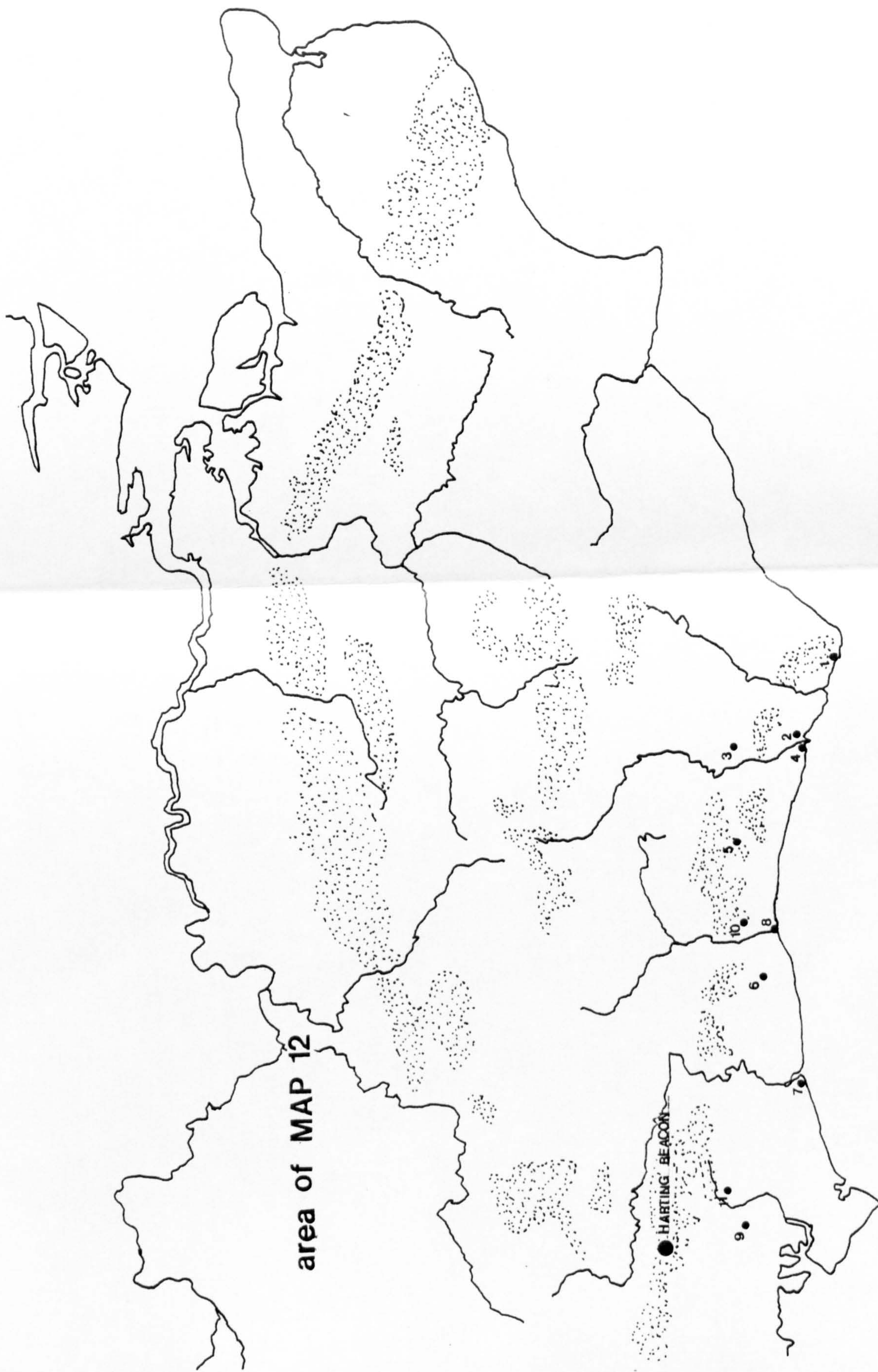
MAP 8.



MAP 9.

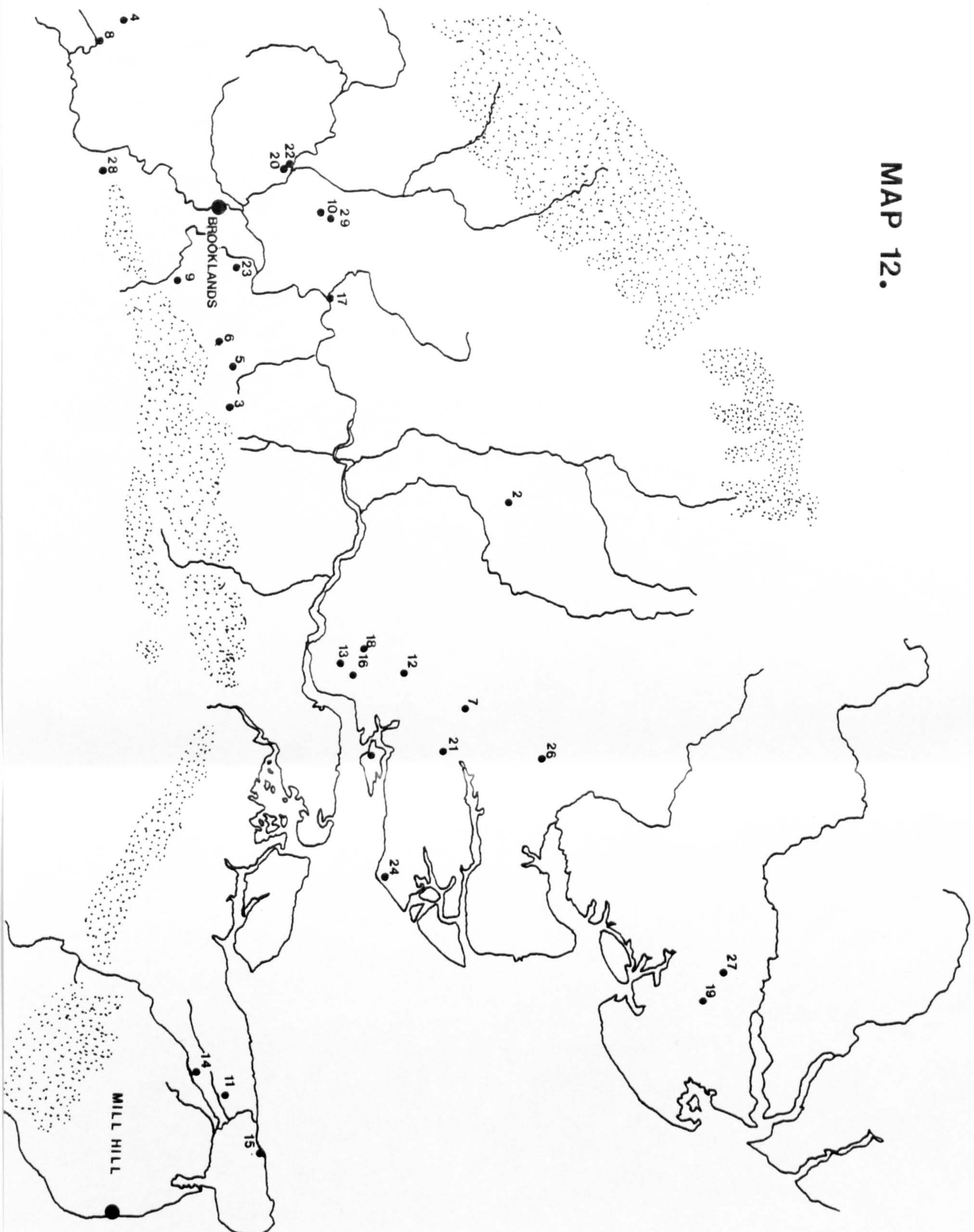






MAP 11.

MAP 12.



MAP 13.



MAP 14.





MAP 15.